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ANNEX

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THE

WONDERS OF THE WORLD;

COMPRISING

MAN,	PLANTS,
QUADRUPEDS,	MOUNTAINS,
BIRDS,	CAVES,
FISHES,	VOLCANOES,
TREES,	RIVERS,

CITIES, REMARKABLE EDIFICES, RUINS,

ANTIQUITIES, &c., &c.

WITH SEVERAL HUNDRED ILLUSTRATIVE EMBELLISHMENTS.

SECOND SERIES.

CAREFULLY COMPILED FROM THE BEST SOURCES,

BY ROBERT SEARS.

NEW YORK:
PUBLISHED BY ROBERT SEARS,
181 WILLIAM-STREET.

1856.

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DEDICATORY PREFACE.

TO ANDREW M'MAKIN, Esq.,

EDITOR AND PROPRIETOR OF THE PHILADELPHIA SATURDAY COURIER.

Dear Sir: Permit me to dedicate to you this "Second Series" of Wonders of the World, as a sincere token of friendship, a slight acknowledgment of the many acts of kindness you have rendered to myself, and a tribute of respect justly due to you for your unwearied efforts to advance American Literature, and the great cause of popular education. In fact, my dear sir, from the ferny tops of our northern mountains to the orange and fig regions of the sunny south—from the pineclad borders of the Kennebec to the cotton-bottoms of the Mississippi, and even to the sugar-lands of the Rio Grande—from that section of our country where nature appears in her most icy garb, to that where her face is clothed with a perpetual smile—your name and your weekly sheet may be constantly seen, adorning the mansion of the rich merchant, and gladdening the pioneer tenants of the humblest log-cabin.

And there is great propriety in my dedicating this book to you. You and myself are engaged in the same enterprise. While you make a spirit-stirring appeal to your readers every week, and thus furnish them as it were daily with the means of instruction and im-

provement, it has been my aim to attain the same end by appealing to them less frequently. My aim, like yours, is to instruct and amuse, confident that the Palladium of American Liberty, the security of republican institutions, the safe advance of liberal principles, and, in short, the Christian happiness of the whole world, are to be found, not by introducing into a community the refinements of luxury and wealth, and the unbounded gratification of sensual wishes and desires—no! but by placing within the reach of every one substantial food for the mind—reading which ennobles and does not degrade, which instructs while it amuses, which teaches lessons of self-denying virtue, which shows the prosperous and happy career of untiring industry, and of heroic perseverance in doing good.

You may ask my reasons for publishing a second series of Wonders of the World. It has been done to gratify the numerous readers of the first series, and in obedience to the request of my numerous agents. "CAN YOU NOT GIVE US ANOTHER VOLUME UPON THE WONDERS OF THE WORLD?" is the almost daily question of my many colporteurs. I have had this volume under advice for many months, but numerous avocations have prevented its appearance till now.

Hoping it may meet the approval of yourself and numerous friends, and that it may respond to the wishes of those for whom it is intended, I remain, as ever,

Yours, respectfully,

ROBERT SEARS.

NEW YORK, *October* 14, 1847.

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SUBJECT I.

MAN.

N glancing at the different wonders of the world, we find that man, the lord of creation, made after the image of God, is himself one of the greatest.

Linnæus placed man in the order of *quadrumana*, or four-handed, in fellowship with the monkey tribe, and even considered the genus *homo* as consisting of two species, the orang-outang being the second, the congener of the human being. Cuvier, with an obvious propriety, has departed from this classification, and placed man in an order by himself, that of *bimana*, or two handed, in allusion to the prehensory organs with which he is furnished. They are instruments of essential moment to their possessor, and form a characteristic mark of his nobility, for, strictly speaking, he is the only bimane. In several physical respects, man is far inferior to many of the lower animals. The elephant is his superior in bulk and power, the hawk in sight, the antelope in swiftness, the hound in scent, and the squirrel in agility. No animal, in the infancy of existence, continues for so long a period in a state of helplessness and dependence, or suffers for an equal interval infirmity in age. To every other animal nature supplies an appropriate clothing, for which they "toil not, neither do they spin"—the office of man; without which, he would live and die in the nakedness of his birth. No parallel to his case can be found in the animal kingdom, in relation to the slowness of his growth, the variety of his wants, and the numerous diseases to which he is exposed; and while animals directly adapt to their support the food that is suited to them—the lion his flesh, and the ox his grasses—the greater part of the human aliment, according to the practice of all nations, is subject to preparing processes, more or less rude or perfect, in order to be rendered agreeable and nutritious. These are apparently the hardships of the human condition: but a regard to their moral and

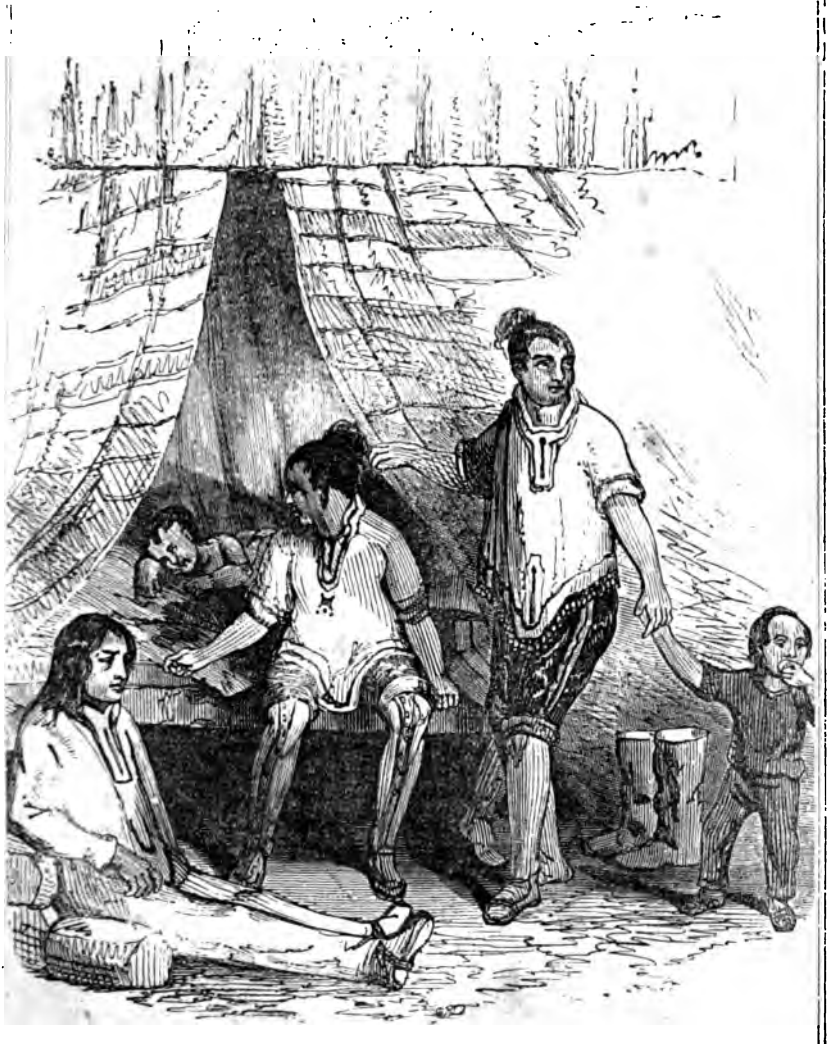
intellectual effect will strip them of the character of disadvantages. If er dowed with a high degree of physical force, if free from the necessity of cul nary preparation, if naturally arrayed against the exigencies of climate, an thus constituted with a greater amount of personal independence—it may rea sonably be inferred that civilization would not have made its present advance that mental capacity would have remained largely undeveloped, and the carce of man exhibited a succession of melancholy oscillation. between intemperat ferocity and selfish indolence. The sense of his weakness and the pressur of his wants have contributed to call forth his resources, to stir up "the gif and faculty divine," to rouse inventive powers to action, which would othe wise have continued dormant, and to excite benevolent affections, by the de mand he is compelled to make for the society of his kind; and thus the ver disabilities of his mere animal being tend to evoke his higher nature, and t accomplish one of the designed ends of his creation by sheer intellectua power, that of having "dominion over the fowl of the air, and over the fish o the sea, and over the cattle, and over every creeping thing that creepeth o the earth."

The human population of the globe has been commonly rated at eight hur dred millions, but this is probably an error in excess. The statements of ge ographers vary considerably, as appears from the following estimates of tw of the most distinguished, MM. Malte-Brun and Balbi. The former justl remarks, that all the calculations that have been made upon the subject ar chimerical, and that it is impossible to state any which shall even approximat to the truth.

	Malte-Brun.	Balbi.
Population of Europe	170,000,000	227,700,000
" Asia	320,000,000	390,000,000
" Africa	70,000,000	60,000,000
" America	45,000,000	39,000,000
" Oceanica	20,000,000	20,300,000
	625,000,000	737,000,000

But however uncertain the numbers of the human race, maritime and inlan discovery shows the wide dispersion of the species, to the extreme bounds o vegetable life, and the extraordinary facility of the human frame in accomm dating itself to diverse circumstances. There are but few tracts of land whic have not within their limits an indigenous human population. The antarcti continent, the Falkland isles, and Kerguelen's Land, with Nova Zembla an Spitzbergen in the northern zone, are the principal exceptions. St. Helen is also another; for when that island was discovered, in 1501, it was only o cupied by sea-fowl, occasionally visited by seals and turtles, and covered wit forest-trees and shrubs. However small the coral islands of the Pacific, an remote from continents, they have in general their families of men. The Ne World, though very scantily peopled, has the Esquimaux at its northern e tremity, within ten degrees of the pole, and the Fuegians at its southern en perhaps in the lowest condition in which humanity exists upon the face of th globe. In the Ancient World, we everywhere meet with traces of man an of his works, except in the zone of deserts; and even here he has planted h race in the oases, the verdant isles of the great ocean of sand. In situatio high and low, dry and moist, cold and hot, we find members of the family t which we belong, enduring the extremes of temperature—a degree of he which on the banks of the Senegal causes spirits of wine to boil, and of cold i the northeast of Asia which freezes brandy and mercury.

This wide diffusion of the species, occupying every variety of climate, so



Interior of an Esquimaux Hut.

and situation, necessarily involves the fact of man being omnivorous, or able to derive support from all kinds of aliment; for otherwise, if his nourishment depended exclusively upon animal or vegetable food, various regions where the race exists and multiplies would be incompatible with the easy maintenance of human life. In the cold and frozen north, beyond the range of the cereal plants, where excessive poverty marks the only vegetation that appears, the tribes of Esquimaux draw their support entirely from the land and marine animals, principally from fish and seals; and this is also the case with the miserable Petcheres, inhabiting a corresponding district in the southern hemisphere, the chill and barren shores of Terra del Fuego. On the other hand, the condition of many interior tropical countries is not propitious to the subsistence of an extended population of the domestic animals and the common cerealia, owing to the number of the beasts of prey and the interchange of a flooded and a parching soil; and there we find large families of men chiefly sustained by a peculiar farinaceous diet, the fruits of the plantain and the palm. In the temperate zone, a plentiful supply of both animal and vegetable food is met with, which mingle in the aliment of the inhabitants. Thus, as we approach the poles, man does not live by bread at all, the Esquimaux being unacquainted with it; while approaching the equator, he is mainly supported by vegetable nutriment; and intermediate between them he is strikingly omnivorous, various kinds of grain and flesh composing the staff of life. Some naturalists have proposed a classification of mankind according to the species of food by the use of which they are distinguished. Thus we have carnivorous, or flesh-eaters; ichthyophagists, or fish-eaters; frugivorous, or fruit and corn eaters; acridophagists, or locust-eaters; geophagists, or earth-eaters; anthropophagists, or man-eaters; and omnivorous, or devourers of everything. But we have no tribes of men that exclusively belong to any one of these classes. The only clear division that can be made of the human race, taking their food as a characteristic, is the very general one already stated, between the inhabitants of polar, temperate, and tropical regions; and growing intercommunication is constantly lessening the amount of difference even here, by transporting the aliment yielded in abundance in one district to another naturally destitute of it. The locust-eaters include some of the wandering Arabs of northern Africa and western Asia, where the crested locust, one of the largest species of the tribe, is made use of for food, both fresh and salted; in which last state it is sold in some of the markets of the Levant. Morier, in his "Second Journey to Persia," observes that locusts are sold at Bushire as food, to the lowest of the peasantry, when dried; and he adds that "the locusts and wild honey, which St. John ate in the wilderness, are perhaps particularly mentioned to show that he fared as the poorest of men." The Otomacs, one of the rudest of the American tribes, living on the banks of the Orinoco and its tributaries, are geophagists, or earth-eaters. When the waters are low, they live on fish and turtles; but when the rivers swell, and it becomes difficult to procure that food, they eat daily a large portion of clay for the purpose of allaying hunger. Humboldt found in their huts heaps of it in the form of balls, piled up in pyramids three or four feet high. The substance is fine and unctuous, of a yellowish-gray color, containing silica and alumina, with three or four per cent. of lime.

In considering the distribution of mankind, it is an obvious reflection that to secure the general diffusion of human life, the same necessity did not exist, as in the case of plants and animals, for parent stocks to be originally planted in different regions of the globe. It has been correctly remarked that had an individual of each tribe of plants, and a pair of each tribe of animals been called into being in one and the same spot—the Linnæan hypothesis—

Ozora Esther.

Kofia Yaoma

large regions, separated by wide seas and lofty chains of mountains from the country containing that single spot, would for ever have remained almost, if not entirely, destitute of plants and animals, unless at the same time means had been provided for their dispersion far more effectual than any which we behold in operation, and a constitution more accommodated to diverse climates had been given to them. To accomplish the dissemination of animal and vegetable life, to an extent commensurate with the capacity of the globe, separate regions were supplied with distinct stocks of plants and animals. But the case of man required no such arrangement to secure a large occupancy of the earth with his species. Endued with a constitution capable of accommodating itself to extreme diversities of climate, and with intelligence to invent methods of protection against atmospheric influences; enabled also by the same intelligence to devise means of transport over the most extensive seas, and across the most formidable ranges of mountains, it is clear that, possessed of these capabilities, the whole habitable earth might be replenished with his race from the location of a single pair. This is the doctrine of the Mosaic history, and also of another part of the sacred record, which declares that God "hath made of one blood all nations of men for to dwell on all the face of the earth;" and notwithstanding numerous and important diversities, the conclusions of philosophical inquiry are clearly in harmony with it, establishing the unity of mankind.

Before touching upon the question of the common nature and origin of the human race, a necessary preliminary to the question of their diffusion, it may be requisite to state the sense of certain terms of common occurrence in natural history, as *species*, *genus*, and *varieties*. A race of animals, or plants, which constantly transmit from one generation to another the same peculiar organization, constitute what is technically called a *species;* and two races are held to be specifically distinct where a marked difference of organization exists, which is unvaryingly transmitted. A species therefore includes those animals and plants which may be presumed to have sprung from the same parent stock. "We unite," says De Candolle, "under the designation of a species, all those individuals who mutually bear to each other so close a resemblance as to allow of our supposing that they may have proceeded originally from a single being, or a single pair." The term *genus* has a more comprehensive signification. It is applied to a group of animals or plants, the several tribes of which seem constructed after a common general model, each being distinguished from the rest by a peculiarity of organization, for which we can not account but by supposing them to have proceeded from originally-different individuals. Animals of the horse-kind, which includes the ass and the zebra, furnish an example of genus. They display the phenomena of general resemblance, but with such marked differences, which are regularly transmitted, that we can not suppose them the common offspring of the same individuals, but to have descended from originally-different pairs. Animals of the feline race, as the cat and the tiger, and of the bovine kind, as the ox, buffalo, and bison, are similar instances of genera. A genus therefore embraces several species. But within the limits of a species varieties occur, or deviations from the type exhibited by the parent stock, which are due to external causes, climate, soil, food, and other agencies, which have an obvious and marked effect upon animal and vegetable forms, however little their operation is understood. Some of these varieties are transient, but others become fixed and permanent in the race, and are so optically striking, as in several cases to suggest the idea of a specific difference, where the species is identical. Now, the question to be considered in relation to man is, whether the diversities which he exhibits in different parts of the globe are compatible with his race coming un-

Man of Terra del Fuego.

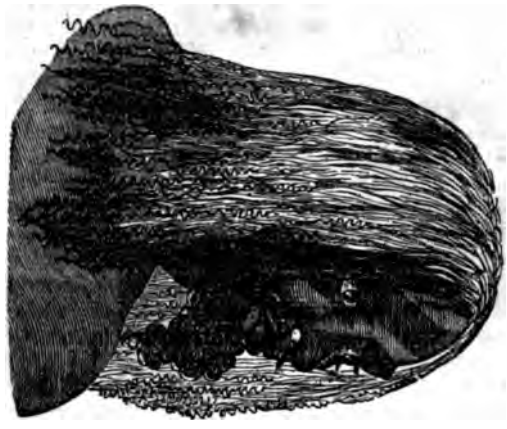
Woman of Easter Island.

der the denomination of a species, having a common ancestry; or whether it forms a genus including several tribes, having a general resemblance, but so characteristically different as to lead the philosophical investigator to the verdict that the diverging streams of humanity have originated independent of each other, and have not proceeded from the same fountain-head.

In prosecuting this inquiry, one method to be adopted is to review the principal external differences observable among mankind, as to complexion, structure, and stature; and examine, whether analogous diversities appear among the lower animals within the limits of the same species. If it is ascertained that corresponding phenomena to the human variations occur in the case of animals belonging to an identical species, the chief objection is obviated to the unity and common origin of the human kind.

1. The most obvious distinction displayed by mankind, is that of *color*, in relation to the skin, hair, and eyes, which, with few exceptions, are well-known to have a certain correspondence, intimating their dependence on a common cause. Thus light-colored hair is very generally in alliance with light blue or gray eyes; but a relation of the complexion of the skin to the hue of the hair is still more invariable. Persons of light hair have a fair and transparent skin, which assumes a ruddy tint by exposure to the light and heat of the sun, while the complexion of black-haired individuals is of a darker cast, and acquires a bronze shade in proportion to the intensity of the solar influence admitted to it. The dark-haired women of Syria and Barbary are indeed frequently very white; but this is owing to the careful avoidance of exposure to the effect of climate, which Prichard calls a being "bleached by artificial protection from light, or at least from the solar rays." He discriminates three principal varieties of mankind, taking the color of the hair as the leading character, which he styles the *melanic*, the *xanthous* and the *leucous*. The melanic or black variety, includes all individuals or races who have black or very dark hair; the xanthous or fair class embraces those who have either brown, auburn, yellow, flaxen, or red hair; and the leucous or white variety comprises those who are commonly called albinoes, whose hair is either pure white or cream-colored.

The great majority of the human race belong to the melanic, or black-haired variety, the corresponding hue of the skin being pronounced by Prichard the natural and original complexion of the human species. This hue varies from the deepest black to a copper and olive color, and to a much lighter shade. The Senegal negroes are jet black, and the natives of Malabar, with other nations of India, are nearly so. In some races, the black combines with red, and in others with yellow, as in the instance of the copper and olive-colored tribes of America, Africa, and Asia; and the same indigenous population furnishes examples of great discrepancy as to the character of the tint. "The great difference of color," says Bishop Heber, of the Hindoos, "between different natives, struck me much. Of the crowd by whom we were surrounded, some were black as negroes, others merely copper-colored, and others little darker than the Tunisines, whom I have seen at Liverpool. It is not merely the differences of exposure, since this variety of tint is visible in the fishermen, who are naked all alike. Nor does it depend on caste, since very high caste brahmins are sometimes black, while Pariahs are comparatively fair. It seems, therefore, to be an accidental difference, like that of light and dark complexions in Europe; though where so much of the body is exposed to sight, it becomes more striking here than in our own country. Two observations," he elsewhere observes, "struck me forcibly; first, that the deep bronze is more naturally agreeable to the human eye than the fair skins of Europe, since we are not displeased with it even in

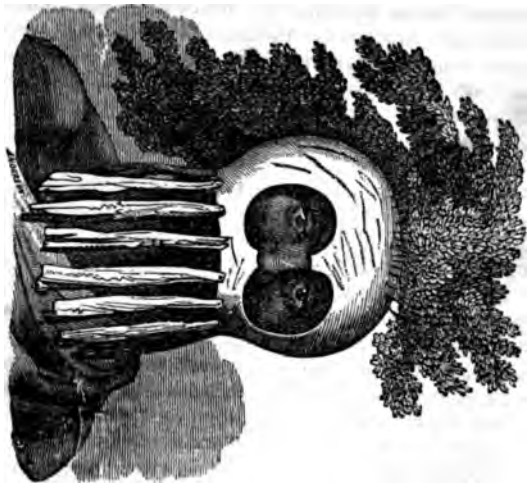


Man of the Island of Tanna.

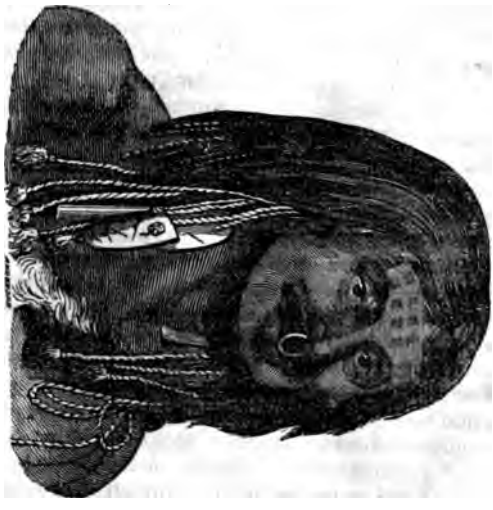
Man of New Zealand.

the first instance, while it is well-known that to them a fair complexion gives the idea of ill health, and of that sort of deformity which, in our eyes, belongs to an albino." The same class includes the swarthy Spaniards, and the inhabitants of southern Europe in general, who have dark hair, with the melanic complexion, only strongly dilute, which characterizes the olive, copper-colored, and negro nations. In the xanthous or light-haired variety, who have commonly gray, or azure blue eyes, combined with a fair complexion, which acquires a ruddy instead of a bronze tinge on exposure to heat, some whole tribes in the temperately cold regions of Europe and Asia are included. Red or yellow hair, and blue eyes, peculiarly characterized the old Gothic races according to the testimony of Tacitus, and are prevalent among their descendants at present. But examples of the xanthous variety present themselves in every dark-haired race, and we gather from Homer, that it was not uncommon among the Greeks of his time to find a melanic family. "The Jews, like the Arabs," says Prichard, "are generally a black-haired race; but I have seen many Jews with light hair and beards, and blue eyes; and in some parts of Germany, the Jews are remarkable for red bushy beards. Many of the Russians are light-haired, though the mass of the Slavonian race is of the melanous variety. The Laplanders are generally of a dark complexion, but the Finns, Mordouines, and Votiaks, who are allied to them in race, are xanthous. Many of the northern Tungusians, or Mantschu Tartars, are of the xanthous variety, though the majority of this nation are black-haired." Even among the more swarthy races of the melanic class, as the negroes of Senegal, examples of fair-haired individuals, with the corresponding complexions, occur; and the native stock of Egypt supplies similar instances, as appears from the light brown hair of some of the mummies. The leucous or white variety includes no entire race of people; but occasionally albinoes, with perfectly white hair and skin, and red or pink eyes, appear in all countries; among the xanthous tribes of Europe, the copper-colored nations of America, and the pure blacks of Africa. The phrase, white negroes, though a literal contradiction, exactly expresses the physical fact—a white individual of a black stock. In some instances, pure white and black children have mingled in the same family, the offspring of black parents.

The springing up of individuals, distinguished from their parents, and from the particular race in general to which they belong, by a different complexion, evidenced by the occurrence of albinoes, and the more frequent grafting of a xanthous variety upon a melanic stock, or the reverse, renders the presumption strong, that those diversities of color which discriminate nations from each other, are mere varieties of a species, due to local causes, which, though they evade our scrutiny, certainly operate to an inferior extent, and yet with an analogical effect, in families at present. The difference in the cases is chiefly one of degree and of duration; but this presents no difficulty when we consider, that strongly-marked varieties of color have been introduced among animals of the same species, and have become permanent, from which a similar phenomon may be inferred in relation to the human race. "In the Mysore there are three varieties of color in the sheep; they are red, black, and white, and these are not distinct breeds. The ass of the Carnatic presents singular varieties of color; some are of the usual ash-color, while others are almost black, in which case the cross on the shoulders disappears. Milk-white asses are also to be found, but they are rare. These are not distinct species, for black individuals have sometimes ash-colored colts, and *vice versâ*. Some remarkable facts are mentioned by Azara with reference to the color of horses and oxen in Paraguay. It is well-known that both these races have run wild in South America, and the climate being congenial to them, have



Man of Sandwich Islands, in a Mask.

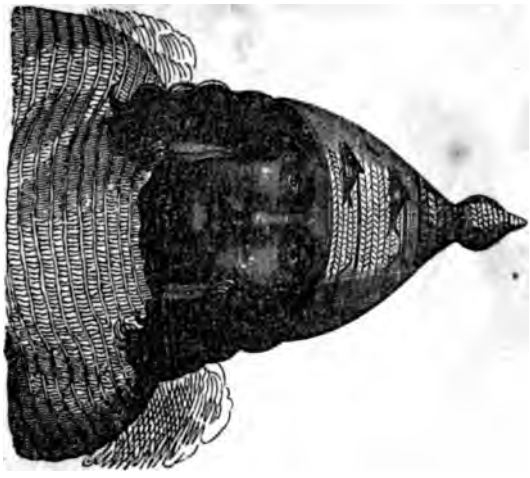


Man of Nootka Sound

mutiplied prodigiously in the fertile plains in the neighborhood of the river de la Plata. Azara says that all the wild horses are of a chestnut or bay-brown color, while the tame horses are of all colors, as in other countries. Hence he conjectures this to be the original color of the race. He makes a parallel observation respecting the ox. Varieties in the colors of animals sometimes spring up casually and sporadically; in other instances they are generally prevalent in particular breeds. In the different parts of England, Wales, and Scotland, there are different breeds of cattle and of horses. In some districts, the oxen are always black; in others, brown or spotted. The cattle of particular countries are immediately recognised by their color. Blumenbach has noticed many examples of the same kind. He remarks that all the swine of Piedmont are black; those of Normandy, white; and those of Bavaria, of a reddish-brown color. The same author observes that the oxen of Hungary are of a grayish white; in Franconia they are red. Horses and dogs are spotted in Corsica: the turkeys of Normandy are black; those of Hanover almost all white. In Guinea, the dogs and the gallinaceous fowls, are as black as the human inhabitants of the same country.

The cause of the introduction of these varieties of color among the inferior animals of the same species, which have become permanent, is involved in great obscurity; but we have good reason to suppose that differences of climate, situation, food, and habits, are some of the influential agencies in their production, chiefly, perhaps, the former, which appears to operate to a considerable extent in the various coloring of the human race. Both the plants and animals of hot regions, display the deepest colors with which we are acquainted, while lighter shades are characteristic of those that are situated in cold countries. Within the tropics, the birds, beasts, flowers, and even fishes, have the respective hues of their feathers, hairs, petals, and scales, uniformly very deeply tinctured; while, as we recede from the equator, the color of the animal races progressively becomes of a lighter caste, till, approaching the poles, white is their common livery. The same remark is true, very generally, of the complexion of mankind. The black, dark-brown, and copper colors prevail in equatorial districts; the lighter olive is distinctive of the nations immediately north of the tropic of Cancer; and still lighter shades become more universal in the higher latitudes. The Abyssinians are much less dark than the negro races, for though their geographical climate is the same, their physical climate is very different, the high table-land of the country placing them in a lower temperature. Shut up within the walls of their seraglios, and secluded from the sun, the Asiatic and African women are frequently as white as the Europeans; while, in our own country, exposure to the sun is well-known to produce a deeper complexion, and artifical protection from its influence is adopted to preserve a fair and unfreckled skin. The larvæ of many insects deposited in dark situations are white, and acquire a brownish hue upon being confined under glasses that admit the influence of the solar rays. Facts of this kind indicate the powerful operation of diverse climates in the various coloring of the human skin, and are sufficient to show that the different complexions of mankind are mere varieties of species, introduced and rendered permanent by the continued action of local causes.

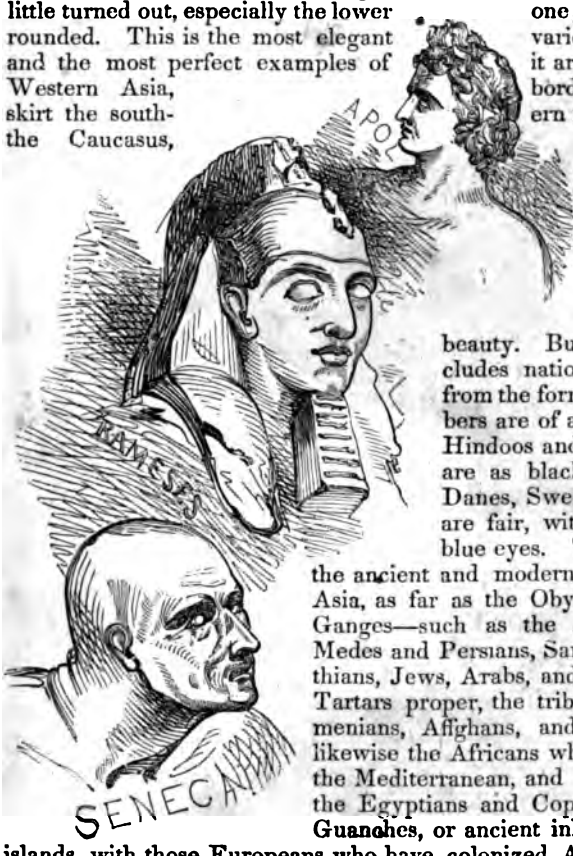
2. The most obvious and important of the human differences involves variety of structure, especially in the *shape of the skull.* Taking this as the basis of a classification, Professor Blumenbach proposed a division of mankind into five grand classes—the Caucasian, Mongolian, Ethiopic, American, and Malay, which has been very generally adopted. The principal descriptive particulars of each, as given by that distinguished naturalist, are the following:—



Woman of Nootka Sound.

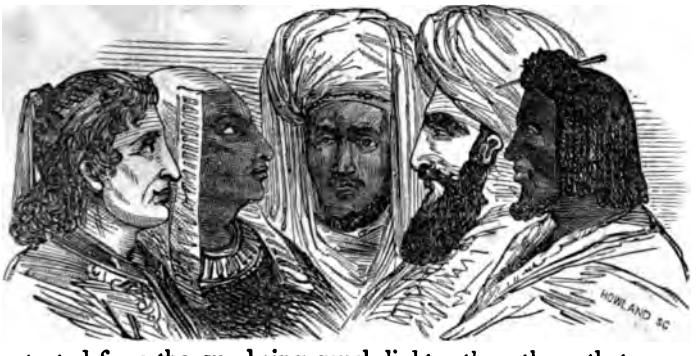
Man of Prince William's Sound.

In the Caucasian race, the head is of the most symmetrical shape, almost round; the forehead of moderate extent; the cheek-bones rather narrow, without any projection; the face straight and oval, with the features tolerably distinct; the nose narrow, and slightly arched; the mouth small, with the lips a little turned out, especially the lower one; and the chin full and rounded. This is the most elegant variety of the human form, and the most perfect examples of it are found in the regions of Western Asia, bordering on Europe, which skirt the southern foot of the vast chain of the Caucasus, whence the class derives its name, and which is near what is supposed to be the parent spot of the human race. Here are the Circassians and Georgians, the most exquisite models of female beauty. But the Caucasian class includes nations very dissimilar, apart from the form of the head. Its members are of all complexions, from the Hindoos and Arabs, some of whom are as black as the negroes, to the Danes, Swedes, and Norsemen, who are fair, with flaxen hair, and light blue eyes. The class comprises also the ancient and modern inhabitants of western Asia, as far as the Oby, the Belurtagh, and the Ganges—such as the Assyrians, Babylonians, Medes and Persians, Sarmatians, Scythians, Parthians, Jews, Arabs, and Syrians, the Turks and Tartars proper, the tribes of Caucasus, the Armenians, Affghans, and Hindoos. It includes likewise the Africans who live on the shores of the Mediterranean, and throughout the Sahara, the Egyptians and Copts, the Abyssinians, and Guanches, or ancient inhabitants of the Canary islands, with those Europeans who have colonized America and other parts of the world. The color of the Caucasian class seems mainly to depend on climate, on the degree of solar heat to which there is exposure, for they are all born with light complexions, and become dark only as they grow up, and are more freely acted on by the sun. Their hue is found to deepen by a regular gradation from the farthest north, where the members of this class are very fair, through the olive-colored inhabitants of southern Europe, and the swarthy Moors of Northern Africa, till the gradation ends with the deep black natives of the African and Arabian deserts, and of inter-tropical India. The lighter shades of color, however, prevail among the Caucasians, and hence they are correctly styled the white race, though some of them are jet black. Their hair is variously melanic and xanthous, always long, and never woolly like that of the negroes.



In the Mongolian class, that of the brown man of Gmelin, the head, instead of being round, is almost square; the face is broad and flat, with the parts imperfectly distinguished; the arches of the eyebrows are scarcely to be perceived. The complexion is generally olive, sometimes very slight, and ap-

proaching to yellow; but none of this class are known to be fair. The eyes are small and black; the hair dark and strong, but seldom curled, or in great abundance; and there is little or no beard. This division embraces the tribes that occupy the central, east, north, and southeast parts of Asia; the people of China and Japan, of Thibet, Bootan, and Indo-China, the Finns and Laplanders of northern Europe, and the Esquimaux on the shores of the Arctic ocean. Climate influences the color of many of this class, those parts of the



body protected from the sun being much lighter than those that are uncovered. Dr. Abeel mentions that when he saw the Chinese boatmen throw off their clothes, for the purpose of entering the water to push along the boats, they appeared, when quite naked, as if dressed in light-colored trowsers.

In the Ethiopic division, that of the black man of Gmelin, the head is narrow and compressed at the sides; the forehead very convex and vaulted; the cheek-bones projecting forward; the nostrils are wide, the nose spread, and is almost confounded with the cheeks; the lips are thick, particularly the upper one; the lower part of the face projects considerably; and the skull is in general thick and heavy. The iris of the eye, which is deep-seated, and the skin of this class, are black, as well as the hair, which is generally woolly. These characteristics of the negroes vary less than those of the two former classes, because they are chiefly confined to one climate within the tropics; whereas, the Mongolians and Caucasians are spread through every variety of temperature, from the equator to the polar circle. The division comprises the native Africans to the south of the Sahara and Abyssinia, and of course those who have been transported to the West Indies and America, the natives of New Holland, and various tribes scattered through the islands of the Pacific ocean and the Indian archipelago. Though, for the reason stated, this class exhibits a great general uniformity, examples are not wanting of beauty of feature, and fine stature and proportions, in several races belonging to this department of mankind.

The American variety, that of the red man of Gmelin, approaches to the Mongolian, but the head is less square; the cheek-bones are prominent, yet

not so angular as in the Mongol; the forehead is low, the eyes deep-seated, and the features, viewed in profile, are strongly marked. The skin is red, or of an obscure orange, rusty iron, and copper-color, sometimes nearly black, according to climate and circumstances. The native-American tribes and nations, excepting the Esquimaux, and the descendants of African and European colonists, belong to this class.

In the Malay class, that of the tawny man of Gmelin, the top of the head is slightly narrowed; the face is less narrow than that of the negro; the features are generally more prominent; the hair is black, soft, curled, and abundant; the color of the skin is tawny, but sometimes approaching to that of mahogany. The division embraces the principal tribes of the Indian archipelago, and all the islanders of the Pacific, excepting those which belong to the Ethiopic variety.

The preceding five great divisions of Blumenbach are reduced by some naturalists to three, who consider the Malay class to be only a sub-variety of the Caucasian, and the American a sub-variety of the Mongolian. Cuvier gives only three distinct, well-marked divisions—the white or Caucasian, the yellow or Mongolian, and the negro or Ethiopic; at the same time stating that several tribes diverge so remarkably, that they can scarcely be referred to any one of these varieties. In reality, the more extended arrangement of Blumenbach is but a very imperfect classification of mankind, for not only individuals, but whole tribes, incorporated in each particular division, have distinctive characters which separate them from the rest of the class, and some peculiarities of one division are frequently traceable in the others.

The Caucasians might be readily divided into a large number of races, each having definite characteristics. This is the case also with the Ethiopic class, for there is nearly as much difference between the New-Hollanders and the woolly-headed Africans, included in the same department of the human species, and between a Bosjesmen, a Kaffre, and a negro of Soudan, who are also comprised in the Ethiopic variety, as between a Caucasian, Mongolian, and Malay. It has also occurred that, from the spirit of conquest and of peaceful colonization, nations belonging to the divisions of Blumenbach have become commingled, and have produced, by intermarriage, races which can not be distinctly traced to either the one or the other of the parent-classes. The Mongols, for instance, have spread out from central Asia and largely intermixed with the Caucasians, especially toward their western frontiers, while the Caucasians have intruded into every quarter of the globe, and blended themselves with the native inhabitants of the countries they have overrun. Nowhere has this amalgamation taken place more extensively than in the West-India islands, in the southern United States, in Mexico, and in the northern countries of South America, where the whites have intermixed with the dark-colored native Indians and the negroes violently transported from Africa to minister to their sordid avarice. The Europeans and negroes produce mulattoes; Europeans and mulattoes produce tercerons; Europeans and tercerons produce quadroons, in whom the alleged contamination of dark blood is

Bushman.

Bushwoman.

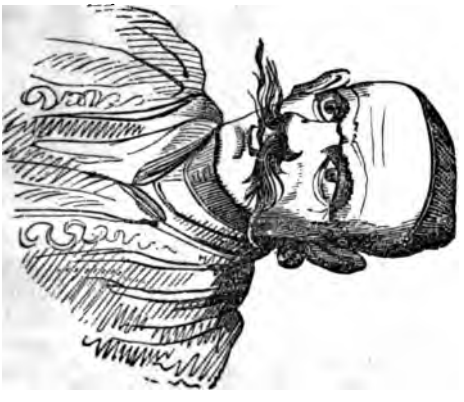
no longer visible, and the negro character disappears. On the other hand, the offspring of a mulatto and a negro, pairing with a negro, the decided African character appears in the children. Indians and Europeans produce mestizoes; Indians and negroes produce zamboes; Europeans and zamboes, and Indians and zamboes, produce respective varieties. It is obvious, therefore, that the preceding divisions of mankind, principally derived from the supposed origin of nations, can only be regarded as extremely general.

Attending exclusively to the form of the human skull, Dr. Prichard discriminates three leading varieties: the symmetrical or oval form, which is that of the European and western Asiatic nations; the narrow and elongated skull, of which the most strongly-marked example is perhaps the cranium of the negro of the Gold Coast; the broad and square-faced skull of the Mongols afford a fair specimen, and the Esquimaux an exaggerated one.

The inquiry now recurs, whether these varieties are compatible with a view of the human race as a species, the offspring of a common stock; and observing what transpires in the case of the lower animals, especially of the domesticated kind, the reply will be clearly in the affirmative. In fact, the diverse structure which arises in the same animal species is far greater than that apparent between one nation of men and another. The horse, ox, dog, sheep, and hog kind, furnish indubitable examples of the truth of the assertion. "What a difference," says Blumenbach, "is there between the horses of Arabia and Syria and those of northern Germany; between the long-legged oxen of the cape of Good Hope and the short-legged breeds of England!" and he asserts that "there is less difference in the form of the skull in the most dissimilar of mankind, than between the elongated heads of the Neapolitan horse and the skull of the Hungarian breed, which is remarkable for its shortness and the extent of the lower jaw." Professor Pallas remarks that a series of skulls, from the large head of the wild horse, to the short head of the Hungarian breed, or the slender head of an English racer, would display more remarkable deviations than any that can be found in the crania of the human races. Blumenbach states of the hog-tribe: "No naturalist has carried his skepticism so far as to doubt the descent of the domestic swine from the wild boar. It is certain that before the discovery of America by the Spaniards, swine were unknown in that quarter of the world, and that they were first carried thither by Europeans. Yet notwithstanding the comparative shortness of the interval, they have in that country degenerated into breeds wonderfully different from each other and from the original stock. These instances of diversity, and those of the hog-tribe in general, may therefore be taken as clear and safe examples of the variations which may be expected to arise in the descendants of one stock. The whole difference between the cranium of a negro and that of a European is by no means greater than that equally-striking difference between the cranium of the wild boar and that of the domestic swine. Those who have not observed this in the animals themselves, need only to cast their eyes on the figure which Daubenton has given of both." Similar instances of variation of structure arising in species, in the case of the inferior animals, might readily be adduced in abundance, and must be accepted as evidence that diversity of structure in the human race is consistent with the doctrine of its unity.

3. The other principal physical variations observable between different nations refer to the *proportion of the limbs*, to *stature*, to the *texture of the skin*, and to the *character of the hair*. Large hands and broad and flat feet are among the peculiarities of the negro; and in general, the arm below the elbow is more elongated in proportion to the length of the upper arm and the height of the person, than in the case of Europeans. But among the latter, individual

Head of a Japanese.



Head of an Albanian.

examples of the same constructions occur, while among the former, inst of structure after the European type may be found. As it respects st the variations are not remarkable in relation to the majority of mankin a striking discrepancy appears upon comparing a few isolated tribes. A ica exhibits the extremes of stature, in the Esquimaux who are general low five feet, and in the Patagonians who are usually more than six, an quently as much as seven; but individual specimens of both extremes a served among the inhabitants of almost every country. Europe has presented the human form developed in gigantic and dwarfish propo The contrasts are striking with reference to the texture of the skin, that negroes and some of the South-sea islanders being always cooler, mor and velvety, than that of the Europeans. Connected probably with va of the skin in texture are the various odors which it is well known bel different races. "The Peruvian Indians," says Humboldt, "who in the dle of the night distinguish the different races by their quick sense of have formed three words to express the odor of the Europeans, the I Americans, and the negro." The diversities are great and obvious character of the hair, from that of the negro, which is short and crisp, a acquired the name of wool, to the long, flowing, and glossy locks of th quimaux, between which there are many gradations.

Precisely parallel varieties are ascertained to arise in the same race of animals. Those of the domestic kind "vary from each other in size much more than individuals the most different in stature among mankind. The small Welsh cattle, compared with the large flocks of the southern counties in England, or the Shetland ponies with the tall-backed mares of Flanders; the Bantam breed with the large English fowls — are well-known examples. In the isles of the Celebes, a race of buffaloes is said to exist which is of the size of a common sheep Pennant has described a variety of the horse in Ceylon not more than inches in height." The swine of Cuba, imported into that island fron rope, have become double the height and magnitude of the stock from they were derived. The disproportionate arm of the negro and leg Hindoo meet an exact parallel in the swine of Normandy, the hind-qu of which are so out of keeping with the fore, that the back forms an in plane to the head; and as the head itself partakes of the same directic snout is but a little removed from the ground. Among domesticated a no species afford more striking specimens of modification in structure th hog-tribe. The external forms which the race has assumed surpass in strosity the most extraordinary diversities of the human frame. "S observes Blumenbach, "in some countries have degenerated into races in singularity, far exceed everything that has been found strange in bod

riety among the human race. Swine with solid hoofs were known to the ancients, and large breeds of them are found in Hungary and Sweden. In like manner the European swine first carried by the Spaniards in 1509 to the island of Cuba, at that time celebrated for its pearl-fishery, degenerated into a monstrous race, with toes that were half a span in length." The texture of the skin of several species of animals is different in a wild and in a domesticated condition; and the character of the hair exhibits analogous variations to that of the tribes of mankind. In the instance of a neglected flock of sheep, the fine wool is soon succeeded by a coarser kind, and the breed approximates to the argali, or wild sheep of Siberia, the original stock, which are covered with hair. The covering of the goat and dog displays the same variety. Thus, the several external distinctions from each other which the nations of men develop, must be admitted to be plainly compatible with their forming a single species, when distinctions of a parallel nature, but more numerous and singular, have arisen within the limits of a species in the inferior animal creation. It may be difficult, nay impossible, to explain the phenomena of external variation; but surely it would be a matter of surprise if it did not exist, considering the variation of external circumstances—arctic cold and tropical heat—flowery savannahs and arid deserts—civilization and barbarism—liberty and oppression—scantiness of food and an abundant supply—nutritious diet and a feebly-supporting fare—the feeling of security and the sense of danger.

If the existence of varieties of structure and complexion offers no argument against the common nature and origin of the millions of mankind in the slightest degree valid, their identity as a species is strongly supported by adverting to the general laws of their animal economy. These have reference to the manner of their birth, the period of gestation, the duration of life, and the casualties in the form of diseases to which they are subject; and, in all these respects, a general coincidence proclaims the unity of the human population of the globe. As to longevity, it is the case indeed that the barbarian tribes are shorter-lived than the cultivated races; but this is owing to the physical hardships under which they suffer, and to ignorance of the appropriate remedies to use under the assailments of sickness, freedom from the former and the knowledge of the latter being possessed by all civilized nations. Facts prove that, in circumstances favorable to extreme longevity, the Europeans, the most polished communities, have no pre-eminence over the tribes of Africa, among the least advanced in the social scale. Mr. Easton, of Salisbury (England), gives the following instances of advanced age from the Europeans and Asiatics:—

	In A. D.	AGED		In A. D.	AGED
Apollonius of Tyana	99	130	Henry Jenkins	1670	169
St. Patrick	491	122	Countess of Desmond	1612	145
Attila	500	124	Thomas Damme	1648	154
Leywarch Hew	500	150	Peter Torton	1724	185
St. Coemgene	618	120	Margaret Patters	1739	137
Piastus, king of Poland	861	120	John Rovin and wife	1741	172 and 164
Thomas Parr	1635	152	St. Mougah or Kentigern	1781	185

In juxtaposition with this list, we may place the following observation of Humboldt relating to the native Americans: "It is by no means uncommon," he remarks, "to see at Mexico, in the temperate zone, half way up the Cordillera, natives, and especially women, reach a hundred years of age. This old age is generally comfortable; for the Mexicans and Peruvian Indians preserve their strength to the last. While I was at Lima, the Indian, Hilario Sari, died at the village of Chiguata, four leagues distant from the town of Arequipa, at the age of one hundred and forty-three. She had been united

in marriage for ninety years to an Indian of the name of Andrea Alea Zar, who attained the age of one hundred and seventeen. This old Peruvian went, at the age of one hundred and thirty, a distance of from three to four leagues daily on foot." Dr. Prichard, from various sources, collected a variety of remarkable instances of negro longevity, of which the two following are samples:—

December 5, 1830, died at St. Andrew's, Jamaica, the property of Sir Edward Hyde East, Robert Lynch, a negro slave in comfortable circumstances, who perfectly recollected the great earthquake in 1692, and further recollected the person and equipages of the lieutenant-governor Sir Henry Morgan, whose third and last governorship commenced in 1680, viz., one hundred and fifty years before. Allowing for this early recollection the age of ten years, this negro must have died at the age of one hundred and sixty.

Died, February 17, 1823, in the bay of St. John's, Antigua, a black woman named Statira. She was a slave, and was hired as a day-laborer during the building of the jail, and was present at the laying of the corner-stone, which ceremony took place one hundred and sixteen years ago. She also stated that she was a young woman grown when the president Sharp assumed the administration of the island, which was in 1706. Allowing her to be fourteen years old at that time, we must conclude her age to be upward of one hundred and thirty years.

The same authority received from a physician at St. Vincent's, as an answer to his query, the statement—"I have known a great many very old negroes whose exact ages could not be ascertained. At the time of the hurricane in 1831, I had a record of the mortality in the whole of my practice from the year 1813, and in every year there were deaths of negroes computed to be sixty, seventy, or eighty years of age, and upward. My father will be eighty-four years old in May next, and the negro woman who carried him about as a child is still living, and at the age of ninety-six enjoying good health, upright in figure, and capable of walking several miles." It may be true that the negroes regarded in mass exhibit a shorter term of life than the European average; but this is sufficiently explained by the privations of their lot in the colonies to which they have been transported, and by an unfavorable climactic influence and geographical site in their native country. The preceding facts show that there is no law forbidding the negro to attain a longevity equal to that of the European in circumstances friendly to it; while placing the European in subjection to the same amount of toil in the West Indies, or planting him amid the swamps, the luxuriant vegetation, the inundation, and heat of western Africa, and his term of life in general would not come up to the negro standard. It appears from the researches of Major Tulloch, as embodied in statistical reports printed by the house of commons, that neither the Saxon, nor Celtic, nor mixed race, composing the troops of Great Britain, can withstand, even under the most favorable circumstances, the deleterious influence of a tropical climate. It is shown, also, that this result is not to be attributed to intemperance, the besetting vice of all soldiers: for though temperance diminishes the effects of climate, and adds to the chances of the European, it is by no means a permanent security. So far as regards the vast regions of the earth, the most fertile, the richest, the question as to their permanent occupancy by the Saxon and Celt, as Britain, or France, or any other country, is now occupied by its native inhabitants, appears, from these reports, to be answered in the negative. "The Anglo-Saxon is now pushing himself toward the tropical countries: but can the Saxon maintain himself in these countries? It is to be feared not. Experience seems to indicate that neither the Saxon nor Celtic races can maintain themselves, in the

strict sense of the word, within tropical countries. To enable them to do so, they require a slave population of native laborers, or of colored men at least, and, in addition, a constant draught from the parent-country. The instances of Cuba, Brazil, Mexico, and Colombia, where the Spanish and Portuguese seem to be able to maintain their ground, do not bear so directly on the question as many may suppose: for, in the first place, we know not precisely the extent to which these have mingled with the dark and native races; and secondly, the emigrants from Spain and Portugal partook, in all probability, more of the Moor, Pelasgic, and even Arab blood, than of the Celt or Saxon."

A careful comparison of different tribes leads to the conclusion that the general phenomena of human life, or those processes which are termed the natural functions, the laws of the animal economy, are remarkably uniform, making allowance for the influence of climates, of modes of living, of localities, and of accidents which interrupt the natural course. The age of puberty announces itself by corresponding symptoms, and that of advanced life by analogous signs of decrepitude, the decrease of the humors, the loss or decay of sight and of the other senses, and a change in the color of the hair. All communities of men appear open to the attack of all kinds of disease, though a few haunt particular districts, and of course only prey upon those exposed to their invasion. In some cases, it is only the old inhabitants of these neighborhoods that are attacked, as in the instance of the *plica polonica*, which afflicts the Sarmatic race on and near the banks of the Vistula, from which the German residents are in a great measure free. But this proves no specific difference between the two, but only shows that, to acquire a predisposition to certain local complaints is a work of time, and will probably appear in new settlers after the lapse of centuries. There is a well-marked variety in the constitution of nations, and in their liability to certain given disorders; but the difference between the torpid American and the irritable European is not greater than the common varieties which meet us within the bounds of the same family, and which render its different members peculiarly subject to different complaints. The conclusion to which these considerations point—that of the identity of mankind as a species—is strongly supported by the fecundity of the offspring of parents of different races. Hunter and other naturalists have advanced it as a law, that if the offspring of two individual animals belonging to different breeds is found to be capable of procreation, the parent animals, though differing from each other in some particulars, are of the same species; and if the offspring so engendered is sterile, then the races from which it is descended are originally distinct. This is a position to which there are many exceptions; but it is undoubtedly true that the energy of propagation is very defective in the product of a union of different species. Tried by this test, the inference is in favor of a common nature belonging to all mankind; for the mixture of originally far-separated human races has repeatedly resulted in a numerous population, physically equal, and in many instances superior, to either branch of the ancestral stock.

It has suited the views of some interested parties in times past, who have their representatives at present, to pronounce certain tribes of men to be distinct species from the whites, constituted upon a type physically and mentally inferior to that of the Caucasian nations. This assumption has been embraced in order to excuse the aggressions of the latter upon the persons and property of the former. Especially has the negro been subject to this treatment; and mental incapacity has been inferred from his retreating forehead and depressed vertex. But this favorite doctrine of the slave-owner, has been amply refuted by the heroes, politicians, and legislators, among the emancipated black population of Hayti— by members of the same race, in other districts, when

under cultivation, displaying a power of intellect, and loftiness of moral cha acter, which would reflect honor upon any of the whites—and by the tes mony of travellers, that, apart from cultivation in his native wilds, the neg is capable of all the benevolent and social feelings of our nature, and mere develops the effect of unfavorable circumstances. The latter varying in n ture and degree, will account satisfactorily for every case of physical ar mental deterioration presented by the human races.

A variety of evidence, psychical and moral, physical and philological, r bukes the ancient boast of Attica, that the Greeks descended from no oth stock of men, the first occupants of the country springing out of the soil—a opinion held by the populace, but not the creed of the philosophers. One the most distinguished anatomists of the day, who can not be suspected of ar prejudice upon the question, Mr. Lawrence, draws this induction from an e tensive series of facts and reasonings: that "the human species, like that the cow, sheep, horse, and pig, and others, is *single;* and that all the diffe ences which it exhibits, are to be regarded merely as varieties." In wh particular spot the location of the primal pair was situated, and what ra now makes the nearest approximation to the original type, are points of son interest, but of no importance, and are now involved in an obscurity which is impossible to remove. That the primitive man occupied some part of tl country traversed by the Tigris and Euphrates, appears to be the best su ported opinion, as it is the most general; and thence there is no difficul in conceiving the diffusion of the race to the remotest habitable districts, the course of ages. In the infancy of society, an increasing population wou speedily outstrip the means of subsistence to be found in a limited distri inducing the necessity of emigration to an unoccupied territory—a proce ing which the natural love of adventure, with the spirit of curiosity and a quisition, so influential in later ages, could not fail to facilitate. Consideri the connexion of Asia, Africa, and Europe, the approximation of the nort ern parts of the two great continents, with the contiguity of the islands Asia to it, we can not marvel, that the races spreading out to these poin should devise means to cross rivers, scale mountains, penetrate into deser and navigate the sea. The spur of necessity, the excitement of enterpris the stimulus of ambition, the occurrence of accident, and, sometimes, the i fluence of fear, created by the commission of crime, have all contributed this result; but perhaps man has more frequently than otherwise, become tl involuntary occupant of isolated and distant islets. Three inhabitants of T hiti had their canoe drifted to the island Wateoo, a distance of five hundre and fifty miles; and Malte Brun relates, that, in 1696, two canoes containi thirty persons were thrown by storms and contrary winds upon one of tl Philippines, eight hundred miles from their own islands. Kotzebue also state that in one of the Caroline isles, he became acquainted with Kadu, a nati of Ulea. Kadu, with three of his countrymen, left Ulea in a sailing-boat, f a day's excursion, when a violent storm arose, and drove them out of the course. For eight months they drifted about in the open sea, according their reckoning by the moon, making a knot on a cord at every new moo Being expert fishermen they were able to maintain themselves by the produc the sea, and caught the falling rain in some vessels that were on board. Kad being a diver, frequently went down to the bottom, where it is well-know that the water is not so salt, taking a cocoa-nut shell with only a small ope ing to receive a supply. When these castaways at last drew near to lan every hope and almost every feeling had died within them; but by the ca of the islanders of Aur, they were soon restored to perfect health. Their di tance from home, in a direct line was one thousand five hundred miles.

SUBJECT II.

MANNERS AND CUSTOMS.

T is scarcely possible not to be delighted as well as improved by the study of any one department of the creation, or even any single object which it comprises; and this is true both with respect to inanimate objects and to those "thousand-fold tribes of dwellers, impelled by thousand-fold instincts," which exist in such profusion and variety in every part of the globe. There is something in the "life and conversation" of the commonest thing to excite our interest if we take the pains of investigation. But it is the study of man which has the highest claim upon our notice; for we can not enter upon inquiries into the history of his varied condition without enlarging the sphere of our own self-knowledge. If "the boy is father to the man," so in the wandering savage some of the most civilized nations may see their own origin, and trace step by step their gradual elevation; and they may also perceive the means by which they are sustained in their present dignified position, and thus be led to cling to and appreciate more highly those blessings and advantages on which civilization must permanently stand. The study of man is also advantageous in another sense; by arousing that sympathy for our common nature which is sure to exist in a rightly-constituted mind, and which, when once excited, becomes active in its endeavors to raise those whom ignorance or oppression has debased and degraded. The present and recent state of the aborigines of South Africa is not one of the least instructive chapters in the history of man, though in many respects it redounds little to the credit of those who assume the rank of civilized beings: unhappily it may be paralleled in nearly all European settlements.

The cape of Good Hope, discovered in 1487 by Bartholomew Diaz, a Portuguese, is nearly the extreme southern point of Africa. A large expanse of ocean surrounds it on every side, extending on the west to the continent of America, on the east to Australia, and on the south to the antarctic pole. The cape was called by its discoverers the cape of Storms, but was afterward changed to its present name on account of the prospects which it excited with regard to the East, then the great current into which European enterprise, and particularly that of the Portuguese, was setting. An unsuccessful attempt was made to form a Portuguese settlement; but for a long period the only advantage of the cape to Europeans was its convenience as a shipping station

and resting-place for mariners voyaging between Europe and the East Indies. Vessels touched there on their homeward and outward voyages, to leave on shore communications to be conveyed in the opposite direction in which they were proceeding. These were put where they were secure from the effects of the weather; and their place of concealment was indicated by a written direction fixed where it could not fail to attract the attention of those who landed.

At length, in 1650, the Dutch, who then enjoyed the largest and most valuable portion of the East-India trade, determined upon forming a settlement at the cape, an outwork singularly well calculated to strengthen their position in the Indian seas. One hundred persons of each sex, taken from the houses of industry at Amsterdam, were sent out as the nucleus of a colony. Independent settlers soon arrived, some driven by religious or political persecution, others by the uneasiness of their circumstances. The revocation of the edict of Nantes drove hither many natives of France, some of whom commenced the cultivation of the vine. Still the colony did not make much progress. Its limits were confined to the peninsula, of about thirty miles long, at the extremity of which stands Cape Town. The Dutch East-India Company, in whom the government was vested, seem to have regarded the colony as entirely subordinate to the great interests of their eastern trade. It is impossible, however, for individuals with many of the most important resources of civilization at command, and continually actuated by self-interest, to remain long without availing themselves of the advantages by which they are surrounded. From being at first almost shut up in their fort at Cape Town, the colonists spread themselves over the Cape district, comprising a surface of three thousand seven hundred square miles; and now about two hundred thousand square miles are covered with their flocks and herds.

The number of Europeans, or the descendants of Europeans, in South Africa, does not exceed one hundred and twenty thousand, and yet it was a much smaller number which acquired possession of all its material resources. The Cape-Dutch are the most numerous class. They are the descendants of the original settlers, or of those who subsequently came from Holland. The country population is almost entirely composed of this class, who possess immense grazing farms and extensive flocks. They are frequently termed Dutch-Africans, and "boors," a corruption of the Dutch word for farmer. The common extent of a boor's farm is six thousand acres; and in the remote parts of the colony they were formerly accustomed to set boundaries at defiance. "All is colony to us," said they, "where we can find a good spring of water and pasturage for our cattle." The frontier boors never thought of dividing their estates (or, to adopt a better word, their domains), but sent out their children to occupy tracts of country as large as their own. The want of fountains and springs formed the only limit to the dispersion of the boors and their families. Flocks and herds of seven thousand and eight thousand, consisting of horned cattle, sheep, and goats, is a common average stock; and some of the richer boors possess above thirteen thousand sheep, and from two thousand to three thousand horned cattle. There being none of the ordinary opportunities for the display of wealth, a rich man is only to be known by the number of his servants and his cattle. The great object is for a man to establish his children in the same circumstances of ease and plenty as himself. Wealth is accumulated very slowly, but very surely, and is hoarded up instead of being invested. Some of the richer boors indulge in the luxury of an equipage; but this consists of a horse-wagon. Many of the boors live in their ox-wagons while their herds are moving about in search of pasture. The possession of horses is regarded as another sign of wealth. The oxen are ill

shaped, but the breed is improving. The number of horned cattle was estimated at three hundred and twelve thousand in 1834.

The boors are exceedingly hospitable and very inquisitive. They are large in stature, but not possessing great muscular strength, and generally inclined to corpulence. Throughout the colony there is little variation in their manners. Their houses have some resemblance to a barn, and are substantially built of well-tempered clay, the outer walls being whitewashed. There is no ceiling, the interior being open to the roof. The rafters are furnished with strings of onions, implements, guns, hunting-apparatus, dried flesh of various kinds of game, &c. The house is divided into three apartments: one a sort of hall, in which the family sit and take their meals, and a room at each end made by a partition-wall of the same height as the outer walls. The private rooms are each lighted by a window, and the hall or sitting-room by two. Cooking is carried on in a small hut adjoining the house; there is neither stove nor chimney in the dwelling-house. In a corner of the hall, within sight of the family, a slaughtered sheep is usually hung; the consumption of a family, including the herdsmen and their dependents, being frequently two sheep a-day. The quantity of corn grown is only sufficient for consumption; an orchard produces peach-brandy; a vineyard, wine; and frequently a small corn-mill is attached to the homestead. The flocks are folded every night, and this is usually a scene of great animation, the farmer with all his family and servants assisting. Thirty cows are milked out of a herd of about seven hundred head. Each gives very considerably less milk than an English cow. The child just born has an interest in the herd, a certain number of stock being marked at the time, and these, with the future increase, are the child's property. This condition of an African-Dutch boor nearly resembles the patriarchal life described in the Old Testament. The whole country for many miles around is often covered with the flocks and herds of the children and the children's children of some wealthy boor. We have now to consider the means by which they acquired these extensive possessions.

When the Dutch settled at the cape, every part of the colonial territory was covered with the flocks and herds of the natives. The Hottentots occupied that part of the territory which is between Cape Town and the interior, and separated the Dutch from other tribes. They constituted a nation governed by chiefs; but the uniformity of manners and customs bound different tribes together, and this gave them a sort of national existence. Availing themselves of the natural capabilities of the country, they had become herdsmen, and existed in a low stage of the pastoral condition. Had they been cultivators of the soil, they would most probably have been prepared to defend every inch of their native land; but a pastoral people have few interests to induce them to contend against the first appearance of encroachment. They are accustomed to wander in search of fresh pasture-grounds, and it is easier to give up a district to which they perhaps only occasionally resort, than struggle for its possession against powerful enemies. The natives have taken to themselves the name of Hottentot; but it did not originate with them. Sir John Barrow says: "When the country was first discovered, and when they were spread over the southern angle of Africa as an independent people, each horde had its particular name; but that by which the collective body as a nation was distinguished, and which at this moment they bear among themselves, is Quaiquæ." Though the Hottentots were a mild and inoffensive people, they were not destitute of spirit. The necessity of defending their flocks against the attacks of the most ferocious wild beasts would contribute to infuse into them some degree of vigor and energy. Living under chiefs capable of exciting them to resist oppression, they defended themselves in several obstinate

Hottentot Herdsman, taken from life.

engagements with the early colonists, who entered into a treaty which was maintained for some years. At this time the number of the colonists was small, and policy and interest rendered them peaceful neighbors. For about half a century after the Dutch had settled at Cape Town the good qualities of the Hottentots were candidly acknowledged. They were remarkable for their love of truth; they were capable of warm attachment, grateful, and honest. Even at a much later period, their standard of morals is represented by old people as having been very high; parental discipline being strict, and great attention being paid to the morals of their youth. Some allowance must doubtless be made for the clannish vanity which would attribute superior virtues to those belonging to the same tribe. They lived in "Kraals," consisting of an assemblage of huts, and enjoyed their property in common, one of them killing an ox or sheep on which all feasted alike; and the next day being destitute of food. The women watched over the flocks while the men were hunting, milked the cows, attended to their household concerns, which occupied but little of their time, wove mats, and collected wood for their evening fires. Sparmann, who visited South Africa in 1775, was one of the last travellers who saw the Hottentots in what may be regarded as their original state. He mentions a woman belonging to one tribe who was possessed of sixty milch cows; and that on the cattle of the kraal being brought home from pasture, the evening was enlivened by singing and dancing. Vaillant, who was in South Africa in 1781, was delighted with the relics which

he witnessed of a system of life of great simplicity. The independence of the Hottentot tribes is now a matter of history and of melancholy reflection, because it has scarcely yet been succeeded by any better form of existence.

The peaceful interval which the aboriginal inhabitants for a time enjoyed is doubtless entirely to be attributed to the fears of the colonists, and to their selfishness not being sufficiently stimulated. During this period they paid for the supplies of cattle which they needed for themselves and for the shipping which touched at Cape Town. When, however, the colony received fresh bands of emigrants, its wants were sometimes greater than its means of supplying them. More land was required to furnish the means of subsistence. Once beyond the reach of the fort, a steady system of encroachment became inevitable. The Hottentots receded, driving their flocks before them, and carrying the materials of their habitations along with them, to be fixed in a more remote district. Thither they were soon followed, the more unprincipled among the colonists finding it advantageous to carry their schemes into effect at a distance from the seat of government, where, as the readiest means of obtaining stock, they could plunder the Hottentots with the least chance of detection. The colonial government was not strong enough to repress these distant crimes, and the scenes of violence which ensued were avenged, as opportunity offered, by the exasperated parties themselves. The gradually-receding boundary was traced with blood. In a despatch by the Dutch governor, in 1702, he confessed his inability to repress these outrages, "because half of the colony would be ruined, so great is the number of the inhabitants implicated." This system could not long exist without the character, both of the colonists and the natives, being deteriorated. The former soon occupied the best pasture-grounds, and the Hottentots had then no superabundance of cattle to barter, even had they been treated with on fair terms. Without land, cattle would have been of no value to them; and without cattle, land was useless. Degraded and maltreated, the Hottentots came to be considered as intruders upon the land which they had once peacefully occupied. Some wandered into remote and inaccessible parts of the interior, where they maintained a precarious existence. Others accepted the means of subsistence from the hands of the colonists, and their wives and children became dependent on their bounty. In time this connexion of the aborigines with the Dutch grew to be worse than slavery. There was but little demand for their labor, and perhaps even in so cheap a country their maintenance was considered burdensome. At all events, the life of the Hottentot was wasted in dangers and fatigues to which a man would not have thought of subjecting his slave, whose death was an actual loss to his owner. His spirit and energies were depressed by injustice, and he became such as his oppressors had described him—weak in intellect and destitute of conduct and forethought, exhibiting the natural course of oppression—degradation, and then its fruits—the vices which enslave the oppressed, and thus do the work of the oppressor.

There was scarcely an instance of cruelty said to have been committed against the slaves in the West-Indian islands that could not find a parallel from the Dutch farmers of the remote districts of the colony toward the Hottentots in their service. Beating and cutting with thongs of the hide of the sea-cow (hippopotamus) or rhinoceros, were only gentle punishments; though these sorts of whips, which they call *sjambocs*, are most horrid instruments, being tough, pliant, and heavy almost as lead. Firing small shot into the legs and thighs of a Hottentot was a punishment not unknown to some of the monsters who inhabited the neighborhood of Camtoos river. By a resolution of the old government, as unjust as it was inhuman, a peasant (boor) was allowed to claim as his property, till the age of five-and-twenty, all the children

of the Hottentots in his service, to whom he had given in their infancy a mor sel of meat. The consequence was, either that individuals were left to shi for themselves, after the best years of their existence had been thrown awa or on some pretence or other they were still kept in bondage. Under an circumstances they could not dispose freely of their labor.

A constant course of cruelty and oppression at length drove even the Hotter tots to resistance. They fled into Kaffreland, leaving their families behind ther and succeeded in exciting some of the Kaffre chiefs to join in an irruption whic carried fire and slaughter along the colonial frontier. The boors felt the ver geance of those whom they had so long oppressed; but the only lesson whic this outbreak taught them was one of cruelty. The people whom they ha treated contemptuously were punished for the spirit they had evinced. Thei dastardly acts of retaliation at length aroused the attention of the authoritie and in 1811 the colonial government (British) instigated a special commissio of inquiry, the proceedings of which were, however, interrupted by the deat of an important witness, and the recall of the earl of Caledon, then governo The establishment of a supreme court, making periodical circuits through a parts of the colony, investigating complaints and trying offenders, was one o the benefits attending a vigilant state of public opinion. The circumstance of society did not furnish machinery so well adapted as could have bee wished for the repression of abuses, and a fair and impartial verdict coul scarcely be expected from men exasperated and prejudiced against the Ho tentot population; but the publicity given to complaints before the suprem court had its effect in repressing the frequency of brutal outrages. The pe manent condition of the Hottentot remained nevertheless unaffected by thes partial ameliorations; and they were chiefly cases of gross cruelty which cam before the courts. The Hottentots could not possess land, and they were un formly employed in the lowest grade of occupation, without any hope of risin The colonists, generally speaking, were averse to their improvement, eithe by moral or religious means. So degraded was the condition of the Hotter tot, that the female slaves thought it beneath them to marry one of these nor inally free people. Such was the state of the Hottentot population for a lon period after the English came into permanent possession of the Cape in 180

We now enter upon a period in which there are indications of the approac if not the arrival, of a more gratifying era in the condition of the Hottent population. This may be attributed to several causes, but chiefly to fou which must be acknowledged to have been attended with the best effect They are: 1. The increase in the European population, which gave mor value to their services. 2. The exertions of the missionaries, who labored t demonstrate their capabilities of improvement. 3. The acts of the loc government, which placed them on a footing with the rest of the free popu lation, and which have subsequently been marked by a desire to render thi a real as well as nominal change. 4. The abolition of slavery, and a mor considerate and enlightened policy enforced by the vigilance of publi opinion in England.

In 1806, the Hottentot population was estimated at 20,426, and the number had increased in 1823 to 30,549. Their gradual decline, whic Barrow had noticed as a consequence of their wretched condition, ha therefore, happily been arrested. But still, the change in their circumsta ces, to which this increase may in a considerable degree be attributed, wa but slight. In 1828 their case was fairly brought before the people of En land, by Mr. Fowell Buxton, who gave notice of a motion in parliament f extending the rights of freemen to the Hottentot population, and placin them exactly upon the same footing as the colonists. It is due to the go

Koranna Hottentots, preparing to smoke.

ernment of the Cape, then administered by General Bourke, to state, that it had caused an ordinance to be issued conferring this privilege upon the Hottentots only two days after the colonial secretary had agreed in parliament to effect the same object. This ordinance of the colonial government, which was afterward confirmed by an order in council, is termed by Mr. Pringle the "Magna Charta of the Aborigines." It was not well received in the colony. The slaves, said the colonists, might be emancipated, "if the rights of property were not involved," but it was absurd to expect from the Hottentots the energy and provident habits which are essential to a state of freedom. The slave, they remarked, was careful and economical, adding to his little comforts, while the Hottentot recklessly spent his earnings in liquor or useless finery. They could scarcely have pronounced a more severe sentence upon their own past neglect. The ruin of the colony was confidently predicted as the consequence of giving the Hottentot the right of freely disposing of his labor, and it must be confessed there were some grounds for anxiety as to the operation of the change. Their servitude had been hard and cheerless, and the period of emancipation was anticipated by many, who left their service before the expiration of their contracts. Others became vagrants—a natural reaction, to be attributed to the small degree of personal liberty which they had previously enjoyed. The district towns, where cheap brandy could be obtained with little exertion, attracted many. A few were driven by their improvident habits to support themselves by plunder. These temporary evils were artfully increased by some of the colonists. A large majority of the Hottentot population, however, were not drawn from their ordinary habits by the colonial ordinance, but continued under their old masters, protected by the law against those outrages to which they had long submitted. Punishment was no longer awarded them at the caprice of their employer, but could only be applied for offences which the law designated as illegal, after a trial before a magistrate, at which evidence must be regularly taken. Adequate wages were to be offered to them, or they could refuse to be employed; and the increase in the European population was occasioning a demand for their labor, of which they were reaping the benefit at a crisis of great importance to their interests. The right of Hottentots to their children, which had been so often shamefully violated, was recognised. The progress of improvement, though retarded, can not wholly be stopped when once it originates in right principles. It is only from this point that we may look upon the Hottentot population as having fairly set forth in the career of civilization.

The capabilities of the Hottentots for civilization appear in a favorable light in those instances in which they have been fairly tried. In 1829, a colony of free Hottentots was formed in a tract of wild country, formerly occupied by Makomo, a Kaffre chief. It commanded extensive means of irrigation, and was divided into locations of from four to six thousand acres, in each of which, one, two, or more villages, were formed.

The arable land was divided into allotments of from four to six acres. A family obtaining one of these allotments was required to build a substantial cottage, to enclose the land, and bring it into a profitable state of cultivation in five years. These conditions being fulfilled, the property became the fee-simple of the cultivator and his family, who, if their conduct had been good, and they possessed the means of tilling more land, had the privilege of obtaining an additional allotment. The pasture land was held in common, and each colonist kept on it a quantity of stock proportioned to the extent of his arable land. A reserve of land was made for a school and for the site of a town. In 1823, Mr. Pringle had proposed a scheme for defending

the eastern frontier of the colony, by a settlement of Hottentots established in a line of villages. This plan was partially acted upon. Some of these free settlers possessed live stock, but the majority had nothing to subsist upon but wild roots, until they could obtain a return for their labor. The natural difficulties attending the settling of a community were met with patience and fairly overcome. Canals of irrigation, indispensable to the cultivation of the soil in South Africa, were cut to the extent of twenty thousand yards; in many places piercing the solid rock. An abundant harvest rewarded their labors; the Kaffres were beaten off, and the prosperity of the settlement becoming known, its numbers were soon swelled to four thousand, of whom seven hundred were armed with muskets. The settlement in its second year was entirely supported on the fruits of its own industry, and a surplus of thirty thousand pounds of barley had been disposed of to the troops, besides other produce conveyed to market. A letter, dated June, 1831, addressed to Mr. Pringle, gives an account equally favorable of the moral improvement which had taken place. "Legal marriage," says the writer, "is now become honorable among the people, and established and connected with their ideas of morality and religion." They also displayed much anxiety for the establishment of schools. Later accounts show that they were raising a superabundance of food; education, morality, and religion, were making progress; the taxes were paid cheerfully. Fifty-five canals of irrigation had been cut, of which forty-four measured nearly forty-four miles; and the Kat river was becoming the safest part of the frontier. In May, 1834, the settlers on the Kat river had subscribed 499*l.* in money and materials to build a church. This is a gratifying instance of the elevation of a people whom there was some reason to fear were beyond the immediate reach of any ameliorating process, however judiciously applied. The manner in which the change was effected shows how worthy the Hottentot people are to take their place as freemen; and the warmest hopes may be indulged as to their future progress in civilization, if rational means be taken to accomplish this object.

The works of Pringle, Philip, and others, who have had opportunities of making themselves acquainted with the Hottentot character, abound with instances in which their good qualities have been brought out. Many parts of South Africa were covered with the aloe, the inspissated juice of which is valuable as an article of commerce. The Hottentot population might have employed themselves very advantageously in collecting this juice; but they regarded money with indifference; they had no desires and no tastes to gratify—a sure sign of a low degree of intellect. Dr. Philip thought that the establishment of a shop stocked with useful articles, the value of which they could appreciate, might have the effect of stimulating habits of industry. The experiment succeeded. "The sight of the goods in the windows and in the shop, produced the effect anticipated; the desire of possessing the articles for use and comfort, by which they were constantly tempted, acquired additional strength on every renewal of stimulus. Money instantly rose in estimation among them; and the women and the children, finding that they could obtain what they desired by collecting the juice of the aloe, were in a short time seen, early and late, engaged in this occupation, or in carrying the produce of their labor to the merchant's shop, to exchange it for clothing and such other articles as might suit their tastes or necessities."

Under the judicious management of some sincere friends to the improvement of the Hottentot people, they not only became skilful cultivators but good handicraftsmen. A blacksmith, masons, and carpenters, were engaged

to teach the people their respective trades; and Dr. Philip says: "There are not, perhaps, better workmen in the colony than several of the Hottentot blacksmiths and masons." Mr. Pacalt, a missionary, pursued the following judicious course of overcoming the natural indolence of the Hottentots. Dr. Philip says: "It was his practice always to work along with them, and gradually to increase the time devoted each day to manual labor; by this means he stimulated them to persevering exertion, and led them from those habits in which one hour's labor in the day was a burden, to work with cheerfulness six or eight. Being accustomed to labor for themselves, they did not feel the same objections as formerly to work for the farmers; and finding that by thus exerting themselves they could obtain European articles of clothing, they gradually renounced the sheep-skin kaross and clothed themselves in British manufactures. While teaching them to build their houses and cultivate their grounds, he enlivened the hours of labor by instructing them, in the most easy and familiar manner, in the principles and duties of religion."

The chief employment of such of the Cape Hottentots as do not reside at the Kat river or other settlements, is herding cattle, an occupation for which they are peculiarly adapted: they are good drivers also, and their services are in considerable demand in this capacity; the boors frequently paying their wages in a certain number of cattle or sheep. The wages in money average from 4*s.* 6*d.* to 7*s.* 6*d.* per month, including living.

There are various branches of the Hottentot race in the colony. Among these are the Korannas, a nomad race, as may be remarked in the cut, being compelled frequently to remove their habitations and seek fresh pasture for their herds: they hold an intermediate rank between the Kaffres and the ancient Hottentots of the Cape. Their habits are well described in the following lines by Mr. Pringle:—

"Fast by his wild resounding river
The listless Koran lingers ever;
Still drives his heifers forth to feed,
Soothed by the gorrah's humming reed;
A rover still unchecked will range,
As humor calls or seasons change;
His tent of mats and leathern gear,
All packed upon the patient steer.

'Mid all his wanderings hating toil,
He never tills the stubborn soil;
But on the milky dams relies,
And what spontaneous earth supplies.
Or should long parching droughts prevail,
And milk, and bulbs, and locusts fail,
He lays him down to sleep away
In languid trance the weary day;
Oft as he feels gaunt hunger's stound,
Still tightening famine's girdle round;
Lulled by the sound of the Gareep,
Beneath the willow's murmuring deep;
Till thunder-clouds, surcharged with rain,
Pour verdure o'er the panting plain;
And call the famished dreamer from his trance,
To feast on milk and game, and wake the moonlight dance."

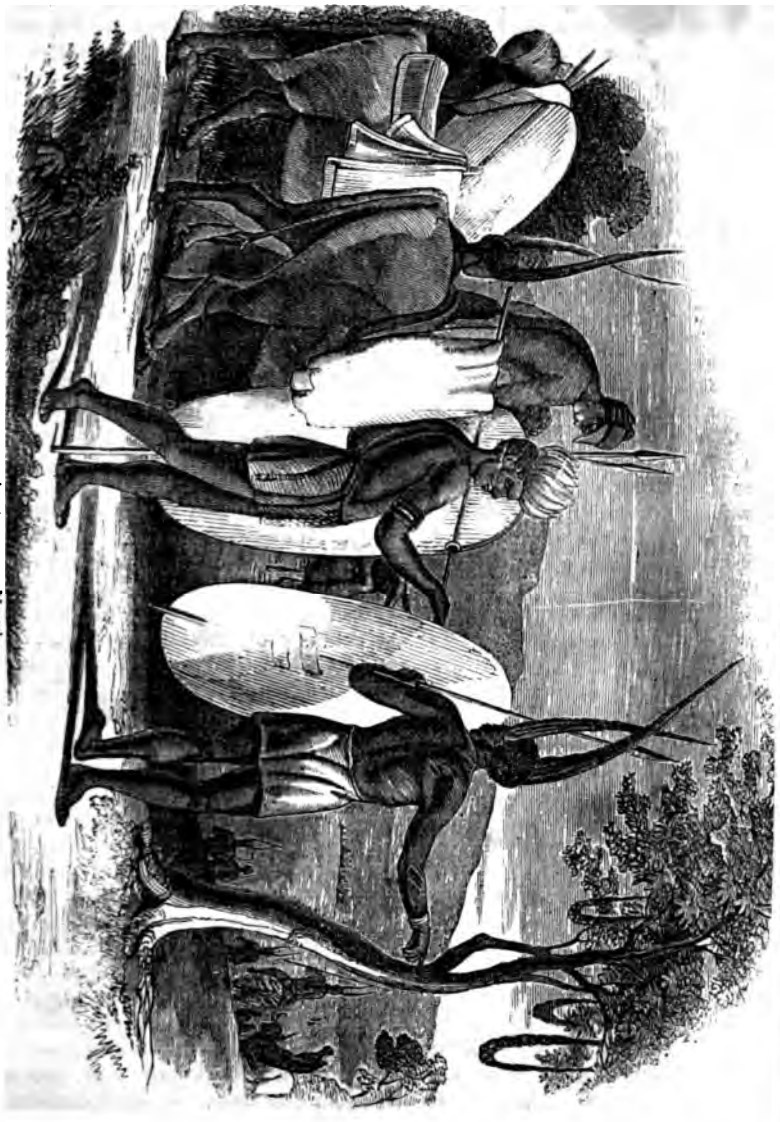
The Kaffres, next to the Hottentots, are the most important class of natives with which the colonists of South Africa have intercourse. The term Kaffre, or Kafir, signifying "infidel," is applied by the natives of North Africa to those of the southeast who are not Mohammedans, and by the Europeans of the Cape it is usually used to designate the Amakosa, Amatembu, and Amaponda tribes, which live on the colonial frontier. These tribes derive their origin from one common stock. They are possessed of

Kaffre Man.

Kaffre Woman.

far more energy than the Hottentots in their best days, and are in a highe grade of the pastoral state, adding the cultivation of maize, millet, water melons, and a few other esculents, to their occupation as herdsmen, an storing up grain for future consumption. They live in kraals of from te to twenty families, under a subordinate chief; a certain number of kraal acknowledging a chief of higher rank as their head. The chiefs are jealou of their dignity. They possess a few privileges which enable them to main tain a certain degree of importance; thus they claim offerings as first-fruits a share of the cattle slaughtered, and other privileges. Wars occur occa sionally, and chiefly arise out of disputes about pasture-grounds. Thei arms are a javelin, a short club, and a large shield made of hide. The ex istence of a Supreme Being is acknowledged, but they pay him no religiou worship, and possess no idols. Their ideas of a future life are vague an indistinct; but they believe, nevertheless, in spirits and apparitions, to whic they sacrifice animals. They are excessively superstitious, and the Ama kira, a prophet or witch-doctor, or rain-maker, exercises a most perniciou influence over them. Individuals are put to death at the instigation of thes characters, and the prophet shares with the chief in the property of his vic tim. Some of the chiefs also pretend to have the power of procuring rain and if their predictions are verified they take the credit to themselves, bu if they fail they attribute the result to the wickedness of the people. On of the most important of their rites this people have in common with th Jews, and its origin is one of the most interesting points in their history but they themselves can give no account of its introduction. They do no eat swine's flesh, nor fish, excepting shell-fish. They have no canoes. Th rights of property in the soil is limited to that only which is under cultiva tion; but the right of pasture is held in common by each kraal. Long established principles and usage serve as a substitute for written law.

The huts of the Kaffres resemble bee-hives in shape, and are usually fron eighteen to twenty feet in diameter, and from six to seven feet high. Pole are stuck in the earth, and boughs are wattled in the interstices and mad to arch over at the top. They are thatched with straw, and plastered wit cow-dung or clay. The fire is placed in the centre, without any apertur but the doorway for ventilation. The door is formed of basket-work. A few mats, coarse earthenware pots, of native manufacture, made of the fin clay taken from deserted ant-hills, a rush-basket, so closely woven as t retain liquids, and a wooden bowl or two, constitute the sole furniture o these simple dwellings. Milk is preserved in skins, and is not used until thick and sour, when it is more nutritious. The kaross, or cloak of sheep skin, rendered soft by currying, forms the dress of both sexes. The chief wear a leopard's skin by way of distinction. The females wear a covering of hide. The personal appearance of the Kaffres is pleasing. Lieutenan Moodie, in his "Ten Years in South Africa," says: "They are elegantl formed, and so graceful that they appear to be a nation of gentlemen. I their manners they are respectful without servility, and possess a native deli cacy which prevents them from giving offence by word or action." Th accounts of their personal appearance are generally supposed to be rathe exaggerated; but there can be little doubt, from the favorable testimon of many travellers, that their appearance and carriage are really preposses sing. Pringle says: "The Kaffres are a tall, athletic, and handsome rac of men, with features often approaching to the European or Asiatic model and excepting their woolly hair, exhibiting few of the peculiarities of th negro race. Their color is a clear dark brown: their address is fran cheerful, and manly." The women are not so good-looking as the me



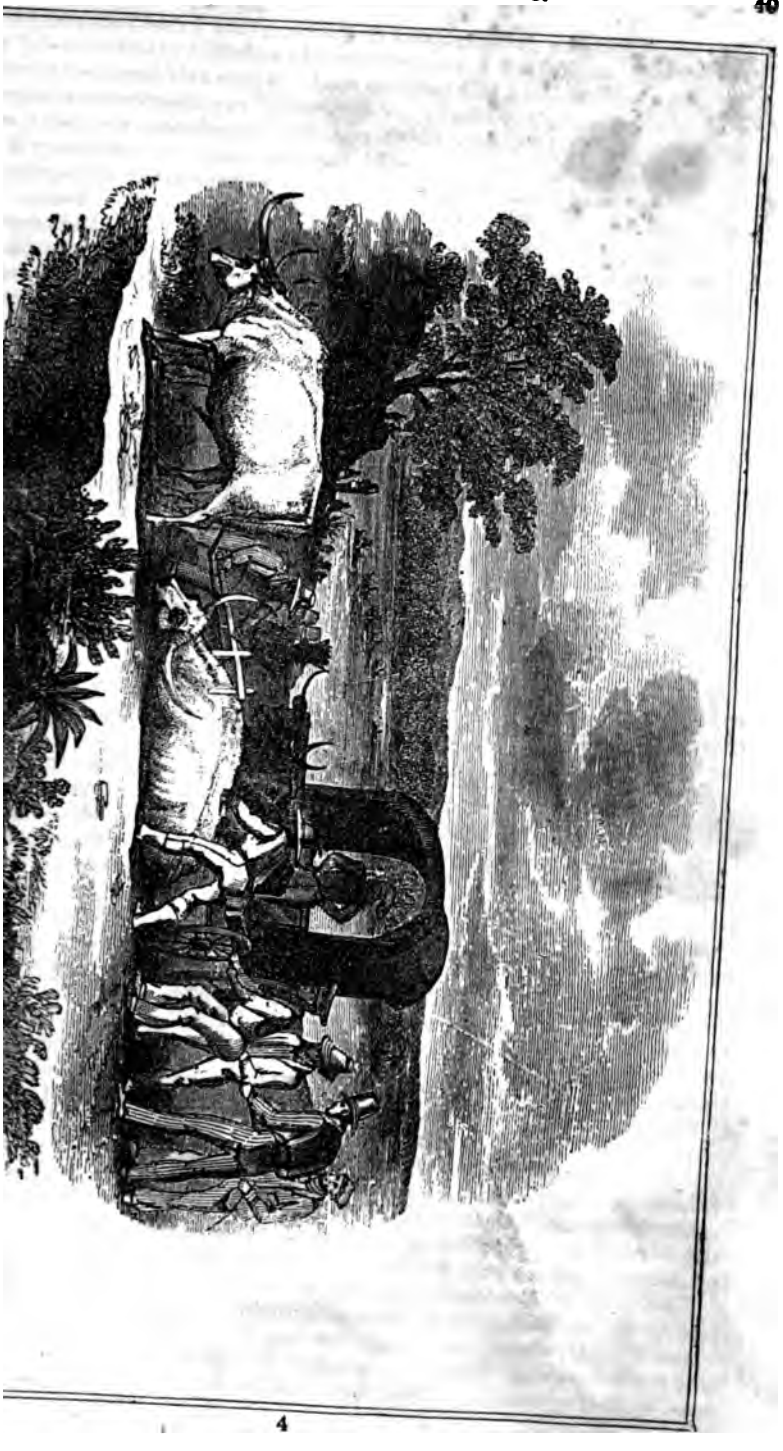
Natives on a March.

owing to the labors which they undergo. The men will enclose their patches of ground and milk the cows, but the actual cultivators are the women, who likewise construct their huts. Polygamy is common, but it is confined to the most wealthy, as the wives are always purchased by cattle. The women take their meals apart from the men. The custom of polygamy is believed to be of recent origin, and arose out of the number of unprotected women who followed a war in which great numbers of the males were killed. The Kaffre language is soft and copious, but the native airs are tame, and not to be compared to those of the Hottentots, whose language, however, is far less agreeable. Though prudent and economical, the Kaffres are exceedingly hospitable. Cattle are, generally speaking, only killed on the occasion of marriages or other festivities.

The Kaffres and Hottentots rear a fine race of oxen, marked with large brown or black clouds. Some are of extraordinary size, with the horns directed forward and upward. It is from these that their *bakeley*, or war-oxen, are chosen; they ride them on all occasions, as they are quick, persevering, extremely docile, and governed by the voice, or a whistle, with surprising intelligence. They thrive most on the zuure velden (sour fields), or saline pastures—fields producing a spontaneous crop of coarse sour grass; and that kind of food may cause the particularly fetid smell of their breath noticed by Sir J. Barrow. The long horns of some of this breed are often trained by the Namaguas and other tribes, so as to twist in spiral curves, or other fanciful forms, which is said to be managed by means of a warm iron.

The engraving opposite presents a party of settlers, with their travelling-wagon drawn by oxen, and they are endeavoring to break in a refractory animal. In the distance oxen are seen swimming across a river. It has been taken from a drawing made by one of the artists attached to Dr. Smith's expedition.

THE TURKS AT CONSTANTINOPLE.—Our engraving on page 51 exhibits some of the peculiarities presented by the streets of Constantinople. Almost all the streets of this city are narrow and winding. Instead of spacious thoroughfares, with the windows of shops set out with wares of all kinds, while passengers on foot and vehicles of every description are incessantly passing and repassing, the streets, with but little exception, are silent and almost deserted-looking during the day; and though toward evening they exhibit a more animated aspect, as the inhabitants come out to pass on to the coffeehouses, or to smoke their pipes in some favorite spot, there is but little of that kind of character which gives the sensation of the "sweet security of streets." The only sort of windows presented by the houses toward the streets are those projections represented in the engraving, containing little windows latticed and closed; and many of the houses have no windows at all toward the streets, but only a low, narrow, dingy door. Mr. M'Farlane, who was in Constantinople in 1828, thus alludes to these windows, in describing a walk through some of the streets: "I walked up one street and down another; for wherever chance led me I was sure to find novelty and interest of some sort. Except what seems the most considerable street of the city—a street that traverses nearly its whole length, and, tolerably broad and airy, runs in a slightly-diverging line from the northwestern extremity of the Hippodrome to the gate of Adrianople—all seemed gloomy and depopulated. I passed through several large empty spaces in the very heart of the town, where houses had been burned down, and not rebuilt; and even in other quarters exempt from the devastation of fire, where the dark red-painted dwellings of the Turks stood close around me, so rarely was a



human being seen, so uninterrupted the silence, that I could scarcely belie myself in the capital of a vast empire—in splendid Stambool—of who overflowing population I had so often read. Some half dozen of times, pe haps, in the course of my musing perigrination, my observations were en vened by the sight of sundry black eyes that (wondering, no doubt, what could be doing in those unfrequented quarters) were seen peeping throu their white *yasmaks*, and the thick lattices (so appropriately denominated French *jalousies*) that shut up every *shah nishin* of a Turk's house. On or twice my ears were greeted with a titter from my concealed observer pleasant sounds—as they showed, at least, that all gayety had not fled fro the place. Another refreshing relief, the charm of which I still recal wi delight, was to catch, through the gloomy avenue of one of the desert streets at the back of the town, a view of the broad blue basin of the Pr pontis, of the lovely Princes' islands, of the distant mountains of Nicom dia, and of the still more remote and sublime heights of the Bithynian Oly pus, all shining gay and bright in the beams of the glorious sun."

Though Mr. M'Farlane saw Constantinople when it was under the infl ence of depressing circumstances, the silence of the streets is a gener description. Our own engraving seems to contradict this, for it exhibits crowd of figures, as if the narrow street was thronged; but the *time* evening, when the middling and poorer classes have a strong inducement do what all classes avoid as much as possible—to *walk* the streets; and t door exhibited in the foreground of the engraving is the door of a coffe house. All the life and activity of the interior of the city is concentrate in the bazars, or bezestines. These are long, wide corridors, communic ting with each other mostly in an irregular and striking manner. Their sid walls are built of stone, and they are covered in with stone arches, or su cessions of domes, through which a subdued light is admitted. The deale are separated by nations, or religions, or by trades.

Another of the peculiarities of the streets of Constantinople, represente in our engraving, is the dogs—those pests of all Mohammedan towns. M hammedanism proscribes dogs as unclean. Hence, although they are excee ingly numerous in towns, they are not attached to particular houses, or belon to particular persons. They live in the streets and open places, and subsi upon offal, with some uncertain assistance from the charity of individual "In large towns," says a note of the "Pictorial Bible," "where there i much activity and intercourse, the dogs do not generaly offer any molest tion to any person in the daytime, or only to persons whom they detect b the scent or costume to be decided foreigners; but at night it is very ha ardous to pass the streets, and few like to do so alone, and never withou being properly armed. When two persons go together, both armed wit strong sticks, they are seldom molested. One person alone, and particular if unarmed, would be in danger of being seriously injured, if not torn t pieces, unless assistance came, as the attack of one dog would serve as signal to bring other in great numbers to the assault. In small towns an villages seldom visited by strangers, the dogs know the inhabitants, and d not molest them, unless, perhaps, when any one of them should happen t stir abroad at night; but a stranger of any description often dares not a proach such places even by day, unless under the conduct of an inhabitant.

The dogs of Constantinople are somewhat more under control, and a not at all so dangerous to strangers, owing to the perpetual influx of fo eigners of all descriptions, and the constant intercourse. Still, they a hungry and savage enough to annoy a European, if not by their attack, least by their presence. "We hardly met a soul on our way up," says M

M'Farlane, describing his landing in Constantinople, "but swarms of sta ving, mangy dogs perambulated the silent streets, giving me an opportunit on my very first arrival, to make the acquaintance of this pest of the Ott man capital."—"Even when dogs are without individual masters they wi frequent the abodes of man. They are found in this half-wild state at Li bon and at Constantinople, and other cities of the east. They are driven unclean from the houses of the Mohammedans, and yet the same peop protect them when they are roaming about their dwellings. The dog of th Seven Sleepers, according to a tale in the Koran, is the only quadrupe admitted into heaven, but the people of the East have more substantial re sons for patronising those half-wild dogs than they find in the legend of their faith. Volney, in his 'Travels,' describes the dogs of Turkey an its dependencies as particularly useful in clearing the streets of the garbag and carrion which would otherwise become the cause of pestilence an death. It is to this circumstance that the powerful but somewhat revoltin description of Lord Byron refers in the poem of the 'Siege of Corinth:'—

> "'I saw the lean dogs beneath the wall
> Hold o'er the dead their carnival,
> Gorging and growling o'er carcass and limb,
> They were too busy to bark at him.'"

The coffeehouses (as we have already stated) naturally attract the notic of a stranger, more than any of the objects he meets with in rambling ove the city. They are found in all quarters of the town, and some of them ar spacious and handsome. They are gaudily painted, and furnished with ma ted platforms and benches: those of the better sort have a fountain in th middle, with a gallery for musicians. A row of large windows discovers t a passenger all that is going on within; and the company, being supplied wit small, low, wicker stools, often choose, in the summer, to sit before the doo in the open air. These coffeehouses are not frequented by persons of th first rank, but occasionally by all others, so that they are seldom empty, an at certain hours are full of company. To a spectator not used to the easter garb and manners, such a motley assembly, variously grouped and placed i picturesque attitudes, compose a no less amusing than interesting scene.

It was in the coffeehouses that the "story-teller" found his stage and au dience. "The recitation of Eastern fables and tales partakes somewhat o a dramatic performance. It is not merely a simple narrative; the story i animated by the manner and action of the speaker. A variety of other story books, besides the Arabian Nights' Entertainments, furnish materials for th story-teller, who, by combining the incidents of different tales, and varyin the catastrophe of such as he has related before, gives them an air of novelt even to persons who at first imagine they are listening to tales with whic they are acquainted. He recites walking to and fro in the middle of th coffee-room, stopping only now and then, when the expression requires som emphatical attitude. He is commonly heard with great attention, and not un frequently, in the midst of some interesting adventure, when the expectatio of the audience is raised to the highest pitch, he breaks off abruptly, an makes his escape from the room, leaving both his heroine and his audience i the utmost embarrassment. Those who happen to be near the door endeavo to detain him, insisting on the story being finished before he departs, but h always makes his retreat good; and the auditors, suspending their curiosit are induced to return at the same hour next day to hear the sequel. He n sooner has made his exit, than the company, in separate parties, fall to disp ting about the characters of the drama, or the event of the unfinished adve ture. The controversy by degrees becomes serious, and opposite opinio

are maintained with no less warmth than if the fate of the city depended on the decision.

But the coffeehouses of Constantinople, though still very numerous and much frequented, are no longer the important places they were. Toward the evening, they are much thronged by Turks, Armenians, Greeks, and Jews, all smoking and indulging in tiny cups of coffee, which is generally drunk by the poorer classes, not only without milk, but without sugar.* Sultan Mahmoud, after suppressing the Janizaries, endeavored to suppress also the coffeehouses, with what success, the following extract from Mr. Macfarlane's "Constantinople," shall tell us:—

"I was much surprised to see the great scarcity of coffeehouses, which abound in Smyrna and in all the Turkish towns I had visited, and was struck with a disproportionate frequency of barbers' shops. It was explained, when, on expressing a wish to rest awhile, my experienced Davide led me into one of those open chambers which, in appearance, was solely devoted to shaving, but which concealed, behind a wooden screen that looked like the end of the room, a spacious recess hung round with chibooks (common pipes), *narghilés* (water-pipes), and tiny coffee-cups. The small charcoal fire for the preparation of the fragrant berry burned in the usual corner, and there were the usual benches and stools. In short, it was a *bonâ-fide* coffeehouse, screened by a barber's shop, and a group of Osmanlis shuffled in immediately after us, not to be shaved, but to smoke their pipes and drink their cups of coffee. On the suppression of the Janizaries, the sultan issued an order for the suppression of the innumerable coffeehouses, the headquarters of those turbulent reprobates, and the usual resort of the idle, the vicious, and the disaffected of the capital. Certain respectable houses in each quarter of the town were licensed. The vagrant story-tellers, who were accustomed to perform, *vivâ voce*, the office of our newspapers, and who were wont to collect crowds in these coffeehouses, shared in the restrictions, and were threatened with the bastinado.

"'But," said I to Davide, 'are all those hundreds of barber's shops we have passed to-day, nothing but veils to coffeehouses?'

"'Not all, but the greater part of them.'

"'Yet the disguise might be easily penetrated; any bostandji might discover the recess, and arrest a crowd of delinquents—as here, for example.'

"'That's all very true, sir,' replied my phlegmatic Chaldean, 'but what would the bostandjis get by that? The fact is, the Turks can not live without coffeehouses; and, besides, the order to shut them up is now an old affair. Each cafidji may make it worth their while not to see; and so, you understand, the Stambool-Effendi and officers of police under him, need not look beyond the barber's shop.'

"During Davide's luminous speech, a starch man of the law and gospel, stepped in and called for a *narghilé*."

The harems of the east are as peculiar and interesting as the coffeehouses.

The literal signification of the word harem is "the forbidden," being the apartment or apartments devoted to the female inmates of a house, and to which no person but the master or the immediate relatives are permitted to have access. This rule is so strictly enforced, or rather so sacredly kept, that

* Wellsted, in his recently published "Travels in Arabia," gives the following amusing illustration of the eastern practice of drinking coffee without sugar: "A party of Bedouins were disputing respecting the sanity of Lady Esther Stanhope; one party strenuously maintaining that it was impossible a lady so charitable, so munificent, could be otherwise than in full possession of her faculties. Their opponents alleged acts as proofs to the contrary. An old man with a white beard called for silence—a call from the aged among the Arabs is seldom made in vain. 'She *is* mad,' said he, and lowering his voice to a whisper, as if fearful such an outrage against established custom should spread beyond his circle, he added, 'for she puts sugar to her coffee!' This was conclusive."

A Turkish Harem.

even in the confusion of war, when the rest of the house is given to pillage the apartments of the women are scrupulously avoided. The term harem is also applied to the female inhabitants of a house, as well as to the apartments in which they reside. That every precaution may be taken to prevent an accidental intrusion into the women's apartments, most Turkish houses are divided into two portions, one for the gentlemen, the other (the windows of which are so constructed that a view of the interior can not be obtained from the outside) for the ladies.

Every house, great and small, is divided into two distinct parts, which only join together by a narrow passage. The first house has a large court before it, and open galleries all round it.

This gallery leads to all the chambers, which are commonly large, and with two rows of windows, the first being of painted glass. They seldom build above two stories, each of which has galleries. The stairs are broad and not often above thirty steps. This is the house belonging to the lord, and the adjoining one is called the *harem*, that is the ladies' apartment (for the name of *seraglio* is peculiar to the grand seignior); it has also a gallery running round it toward the garden, to which all the windows are turned, and the same number of chambers as the other, but more gay and splendid, both in painting and furniture. The second row of windows is very low, with grates like those of convents; the rooms are all spread with Persian carpets, and raised at one end of them about two feet. This is the sofa, which is laid with a richer sort of carpet, and all round it a sort of couch, raised half a foot, covered with rich silk, according to the fancy or magnificence of the owner. Round about this are placed, standing against the wall, two rows of cushions, the first very long, and the next little ones; and here the Turks display their greatest magnificence. They are generally covered with brocade or embroidery of gold wire upon white satin; nothing can look more gay and splendid. These seats are also convenient and easy. The rooms are low, and the ceiling is always of wood, generally inlaid or painted with flowers. They open in many places with folding doors, and serve for cabinets. Between the windows are little arches to set pots of perfume or baskets of flowers. Marble fountains in the lower part of the room, throw up several spouts of water, giving at the same time an agreeable coolness and a pleasant dashing sound as they fall from one basin to another. Some of these are very magnificent. Each house has a bagnio, which consists generally of two or three little rooms, leaded on the top, paved with marble, with basins, cocks of water, and all conveniences for either hot or cold baths.

The difficulty of gaining admission to the interior of a Turkish gentleman's house is not now so much experienced as formerly. This is doubtless owing to the great intercourse which, during the last century, has been maintained between Turkey and the Christian courts, and by which the repugnance to the manners of the Christians, which was formerly so strongly expressed, has given way to a conviction of the necessity for cultivating the arts and processes by which the more northern nations have attained to so great an eminence in all the arts of life, and to the introduction of many of the customs of the Christians, or, as the Turks call them, the Franks.

Lady Montague has given a charming description of a visit to the harem of one of the first officers in the court of the sultan, which is so interesting, that we must run the risk of repeating what is probably known to many of our readers.

After having dined by invitation with the lady of the grand vizier, an honor never before conferred on a Christian, Lady Mary was solicited by a Greek lady who accompanied her, and who acted as interpretess, to visit the lady

of the kyhaïa, the lieutenant, or second officer in the empire, being the deputy of the grand vizier.

"All things here were with quite another air than at the grand vizier's, and the very house confessed the difference between an old devotee and a young beauty. It was nicely clean and magnificent. I was met at the door by two black eunuchs, who led me through a long gallery, between two ranks of beautiful young girls, with their hair finely plaited, almost hanging to their feet, all dressed in fine light damasks brocaded with silver. I was sorry that decency did not permit me to stop and consider them nearer. But that thought was lost upon my entrance into a large room, or rather pavilion, built round with gilded sashes, which were most of them thrown up, and the trees planted near them gave an agreeable shade, which hindered the sun from being troublesome. The jessamines and honeysuckles that twisted round their trunks shed a soft perfume, increased by a white marble fountain playing sweet water in the lower part of the room, which fell into three or four basins with a pleasing sound. The roof was painted with all sorts of flowers, falling out of gilded baskets that seemed tumbling down. On a sofa, raised three steps and covered with fine Persian carpets, sat the kyhaïa's lady, leaning on cushions of white satin, embroidered; and at her feet sat two young girls about twelve years old, lovely as angels, dressed perfectly rich, and almost covered with jewels. But they were hardly seen near the fair Fatima (for that is her name), so much her beauty effaced everything I have seen, nay, all that has been called lovely either in England or Germany. I must own that I never saw anything look so gloriously beautiful, nor can I recollect a face that would have been taken notice of near hers. She stood up to receive me, saluting me after their fashion, putting her hand to her head with a sweetness full of majesty that no court-breeding could ever give. She ordered cushions to be given to me, and took care to place me in the corner, which is the place of honor. I confess though the Greek lady had before given me a great opinion of her beauty, I was so struck with admiration that I could not for sometime speak to her, being wholly taken up in gazing. . . . . Her fair maids were ranged below the sofa, to the number of twenty, and put me in mind of the pictures of the ancient nymphs. I did not think all nature could have furnished such a scene of beauty. She made them a sign to play and dance. Four of them immediately began to play some soft airs on instruments between a lute and a guitar, which they accompanied with their voices, while the others danced by turns. . . . . When the dance was over, four fair slaves came into the room with silver censers in their hands, and perfumed the air with amber, aloes-wood, and other scents. After this they served me coffee upon their knees in the finest Japan china, with soucoups (saucers) of silver, gilt. The lovely Fatima entertained me all this while in the most polite and agreeable manner, calling me often *guzél sultanem*, or the beautiful sultana, and desiring my friendship with the best grace in the world, lamenting that she could not entertain me in my own language.

"When I took my leave, two maids brought in a fine silver basket of embroidered handkerchiefs; she begged me to wear the richest for her sake, and gave the others to my woman and interpretess. I retired through the same ceremonies as before, and could not help thinking I had been some time in Mohammed's paradise, so much was I charmed with what I had seen."

The interior of the Turkish houses is most beautifully fitted up. Even those of the middle classes have the walls painted and ornamented with gold, &c.; but in those of the higher orders the utmost splendor is exhibited. But it is in the ladies' apartments, the harems of the rich, that the true spirit of Turkish magnificence is displayed. The wall are ornamented

with rich and elegant designs, the ceilings painted with gorgeous colors, i all the intricacy of oriental taste, the furniture is of the most elaborate worl manship, the sofas and cushions covered with delicate satin or cloth of gol the carpets of the richest class, the fountains of the purest marble, in shor the rooms and all the accessories are of the most costly description; an when filled with the beautiful forms for whose enjoyment they are so richl adorned, they present a more splendid coup-d'œil than ever entered into th imagination of a poet to conceive. Lady M. W. Montague thus speaks of th harem of a person of quality, the apartment of the lady to whom she befor paid the visit described above:—

"But what would you say if I told you that I have been in a harem wher the winter apartment was wainscoted with inlaid work of mother-of-pear ivory of different colors, and olive-wood, exactly like the little boxes yo have seen brought out of this country; and in whose rooms designed fc summer, the walls are all crusted with japan china, the roofs gilt, and th floors spread with the finest Persian carpets? Yet there is nothing mor true; such is the palace of my lovely friend, the fair Fatima, whom I wa acquainted with at Adrianople. . . . . Her house is magnificently furnishe and very well fancied; her winter rooms being furnished with figured ve vet, on gold ground, and those for summer with fine Indian quilting en broidered with gold. The houses of the great Turkish ladies are kept clea with as much nicety as those in Holland. This was situated in a high pa of the town, and from the window of her summer apartment we had th prospect of the sea, the islands, and the Asian mountains."

From the above extracts it may be presumed that the ordinary notion of harem being little better than a prison is erroneous; the inhabitants gen rally enjoy as much liberty as they require: they pay and receive visits t and from their female friends, and amuse themselves with a variety of pa times while at home. Among these, chess and swinging are great favorite and, while pursuing the latter exercise, the greatest hilarity and boisterou enjoyment is manifest; for the oriental ladies, although generally of a la guid and melancholy temperament, are, in the company of their own se as noisy and unruly in their sports as a bevy of boarding-school misses.

Scenes and Customs in Tunis.—The gulf of Cabes or Gabis, is situa ted in Tripoli, and is formed by the Mediterranean, which washes th shores of Northern Africa. The whole district of Gabis is mountainous and the principal city is Mensel, distant about half a league from the rive No Christians reside here, and ten years since it would have been danger ous to visit it without a strong escort. The Maltese have formed their arm there; and the occupancy of Algiers by the French will doubtless tend t extend civilization here as well as in the parts of Africa directly occupie by them.

The number of Arabs in Mensel may amount to about 5,000, and th population, like that of the whole district of Gabis, are not so much Moor as Arabs. They do not live in tents like their brethren, but in a sort of house, or rather court, which they call "chauch," surrounded by a wall wit a door. Within this space, the horses, camels, cows, goats, poultry, &c., ar all housed. In one corner is the bed, which has a canopy of palm-leave over it, and in another is the kitchen. Two or three chambers, built of cla and stone, are scattered over different parts of the same court.

The men of Gabis are handsome and well made, with black eyes and noble carriage; they are excellent horsemen and expert archers, but, lik all mountaineers, indolent and averse to labor. All the agricultural an domestic employments, except ploughing, devolve upon the women: th

A Butcher of Gabia. A Moorea of Gabia, in her Home Dress.

latter are very fond of trinkets, and wear ear-rings of enormous size, necklaces, frontlets, bracelets, and ankle-rings, of gold, silver, or co The dress of poor and rich is made after the same fashion: it consists white cotton robe which reaches to the heel, and is drawn tight across thighs, where it is divided into two pieces, one of which passes over breast, and the other over the back, and fastens at the neck with a s clasp, which leaves the sides of the body open. The face, especially the chin to the lips, is painted.

The quantity of large hewn stones and marble pillars that are four the neighborhood of Mensel, afford certain indication that some ancient existed in its vicinity; but there are no inscriptions. This old Roman ony may have been about a league distant. There are three cisterns, on which is still in very good preservation. The Arabians relate many derful tales of the splendor of the old town. According to their accou contained fifty market-places, each fitted up with five hundred shops. the vicinity of these ruins stands the little village of Sidi Elbaba, into w neither Jews nor Christians are allowed to enter, because a great saint, was said to have been Mohammed's chief barber, lies buried there. soil in the neighborhood is rich, but, as the indolent inhabitants do not tivate it, it yields but a scanty supply of food, and the European fares badly if he can not subsist upon the bread and oil of the Arabs. The p groves, on the other hand, are exceedingly beautiful. What a par would it become, if inhabited by an industrious and Christian populat but now nothing is to be had but spontaneous productions. The Arabs lie in the shade all day long, indulging in sleep. The Moors smoke tob and play at games, such as chess or backgammon, sit chatting in the co houses or barbers' shops, or go into the bath to pass away time. The is ignorant of all these recreations, and is only roused from his letharg the report of war or plunder: then, in an instant, his horse is saddled weapon seized, and he stands ready for the encounter.

Criminal Causes and Court.—The calif of Gabis sits upon a r throne in a large hall; his chief and only secretary is a Jew, who takes in all questions of debate, and is always consulted by the calif. To right and left, along the walls of the judgment-hall, are placed stone ben for the friends of the calif, and for such of the inhabitants of the plac wish to hear the proceedings. No one is permitted to enter the hall an The calif's servants, also unarmed, walk up and down, ready to exe their master's commands. The plaintiff enters the hall, and kneels dow a distance of three or four paces from the throne, and states his compl The following preliminaries are always observed: "God preserve the calif, and bless thy head, and the heads of thy children, and add to determined years of thy life yet thirty more, and be favorable unto th The calif then answers: "God bless thee! What is thy request?" camel has been stolen from its pasture." "When?" "Yesterday ever when I went to fetch it home, it was nowhere to be found." "Was camel grazing alone, or were there others with it?" "Ali ben Achmet Mustapha ben Achsam had their camels in the same pasturage." " did they find theirs?" "Yes, they are in their house." "Chamude, mude," exclaimed the calif, "go quickly and bring hither Ali ben Ac and Mustapha ben Achsam." He instantly obeyed, and both in a short made their appearance. The calif, drawing himself up, said: "You stolen Masout's camel, and if you do not restore it within two hours, I give each of you five hundred bastinadoes. In the meanwhile put t rogues in prison." They had been scarcely led out, when a person ent

and said that the camel was found, and that the owner might fetch it directly, for it was standing in the house of Ali ben Achmet.

Two camel-drivers had obtained goods of a merchant at Mensel, which they were to convey to Elscherid. The merchant affirmed that he had paid them the freightage, which came to one hundred and thirty piastres, on their packing up the goods. The camel-drivers, on the contrary, maintained that they had received only half of the money. There were no witnesses present. The merchant brought the calif his book, in which he had made an entry of this sum. Both parties were very vehement, and the calif behaved with a dignity which would have done honor to the lord-chancellor of England. When the confusion was somewhat abated, the calif desired the youngest of the camel-drivers to approach; then, turning toward the elder, he said: "By thy head, open not thy mouth till I question thee." Then he again addressed the younger: "My son, thou and thy friend here took the goods to Elscherid?" "*Nam sidi*" (yes sir), he replied. "When thou leftest Mensel how much money hadst thou in thy pocket?" "Not an asper besides what the merchant gave me." "Thou hadst then the half of the wages with thee?" "Yes, sir." "When thou returnedst thou dividedst the remainder, after paying the expenses of the journey: what then was thy share?" "Twenty-five piastres, sir." "Very well; twenty-five piastres: quite fair. Now, how long wast thou on the journey?" "Twenty-seven days, sir." "Didst thou not halt the first night at N——?" "Yes." "Thou hadst two camels and an ass, for the keep of which thou paidst the owner of the Funtucks?" "Six karups." And for thyself how much didst thou spend?" "I bought a loaf, a little oil, and some olives, for four karups." "Your beasts required forage: how didst thou procure that?" "I bought hay and straw for so much." "Well, that makes in all so much. From N——thou wentest to M——, where thy outlay was—" &c. Enough. The calif thus detailed the whole of the journey to and fro, and, reckoning up the karups, made up the sum of one hundred and thirty piastres, by which it was clearly demonstrated that the merchant was right and the camel-drivers wrong. They were then dismissed with a very severe reprimand.

In the meanwhile the captain of the coast-guard, a good-tempered old negro, came in. "Salim," said the calif, "I know thee; thou art true as gold: I would intrust to thee all the treasures in the world; but all are not like thee. A carpet was stolen last night from the vessel of this Christian. Christians speak the truth, which Mussulmans rarely do. Were he a Mussulman, he would have said that he had been robbed of five hundred piastres, which, as calif, I must make good. Salim, see that thou find the carpet; if not, the watchman must pay the price." "Allah save thee. Allah lengthen thy days, O calif! Where shall I seek the carpet? By the prophet, I know nothing of it! We are only guards of the coast, and few in number. The Arabs, as thou knowest, are great thieves; besides, the ship had already sailed a considerable distance down the river, and was no longer in our neighborhood: how then, O calif, can we be answerable for it?" "What do ye call yourselves, then, ye who have pitched your tents at the mouth of the river? What do people call you?" "Guards." "Right: then do ye watch. Thou hast passed sentence upon thyself. Ye are guards, and as such receive pay; therefore ye watch. I have said it: seek the carpet, and I shall not inquire in whose custody it may have been. Meanwhile, only bring it back."

Gerba was formerly a perfect gold-mine for its governors, who were bound to pay over to the Turkish sultan a certain annual sum of money, of no very

derable amount; in return for which they were privileged to plunder the bitants according to their own good-will and pleasure. This appointment been vested in the family of the Bernaiaths of Tunis from time immemo-

The present Sachab Ettaba having, however, contrived to raise himself ı the humble station of a slave to that of prime-minister to the bey, he took cheme more ardently to heart than that of replenishing his master's empty ɜrs; and with this object in view, personally visited the several provinces. ba was one of the spots he explored; and the governor, being prepared the honor, received him in his house, which was decorated in a more than ıcely style. The keen-eyed satrap feasted on this display of splendor and ɡnificence with greedy look, and returned to Tunis. Shortly afterward he ɜred the governor to appear before him, and thus accosted him: "You e shown some dexterity in transferring thy master's substance into thy ı chests; thou hast built thyself houses and set them off in costly array, le our lord and master was in utmost need, and hast well deserved to be g up and have thy property taken from thee: but out of pure friendship, I make thee a present of thy life, it being understood that thou payest two lions of piastres into the treasury forthwith, and never venturest to set in Gerba again." The first part of the condition was fulfilled without ıur, but the family of the Bernaiaths could not digest the humiliating terms he last. A negotiation was therefore set on foot with the exasperated min-r, and pursued with unremitting ardor until he was brought to relent. The ɡraced governor was restored to favor, and confirmed anew in his post of d of Gerba, though on a very different footing. Ten of the principal in-ıitants of the island have been associated with him as councillors, and he been prohibited from levying any dues or imposts without their concur-ce. The prime-minister also fixed the yearly tribute at one hundred and ty thousand piastres, which are collected by the ten councillors upon a derate estimate of each man's means, and remitted to the bey, from whom governor receives his salary. The people of Gerba are no longer under necessity of pretending poverty, but every one is at liberty "to do what likes with his own," and displays his wealth in the full glare of day; a com-n occurrence under the new order of things.

Monument of the Skulls of Christians.—In their social intercourse Gerbese display remarkable refinement of manners; their deportment is asing and urbane; there is so complete an absence of contempt for Chris-ns, that one would be almost tempted to forget that they are deadly ene-es to their faith, were it not for the horrifying memento of their hatred of Christian name which stands on the seashore—a pyramid constructed with skulls and bones of Christians. During the last contest between the Span-ds and Moors on this island, eight hundred gallant combatants threw them-ves into a fort near the shore, and here defended their post bravely. The oors made several attempts to take it by storm, but were always driven ck with considerable loss, and three of their leaders were killed, while not ingle Spaniard had been injured. But the scourge of those who are be-ɡed now overtook them—the means of sustenance failed them. Our hand-of Christians tarried, day after day, for hope of succor and relief: none me near them. Driven by famine, the garrison capitulated, and an unmo-ted retreat was promised them. Scarcely, however, had the Moors been t in possession of the fort, than they fell upon their eight hundred unarmed versaries, slaughtered every individual among them, and, collecting their alls and bones, erected a monument on the seashore, that bears record of ir own barbarity. It has remained standing ever since, and from time to e is washed with color. The Moors who fell in the struggle with these

brave Spaniards lie interred in the vicinity of this pyramid. The number of their graves would lead one to conclude that the number of Moors who perished was considerable. A chapel has been erected over the graves of their three leaders. I was singularly affected on first contemplating this unnatural memento of Moorish perfidy. The gray bones appeared to me as if they moved, and the arms as if they stretched themselves out to me; it seemed as if the hollow skulls beckoned to me, and every fleshless mouth cried out—"Depart, pilgrim, depart and seek your Christian brethren, and tell them that we have, for whole centuries, endured this thrall, and found no abiding-place for our bones. Haply the sound of thy voice may reach the ear of some godly prince, and our bones may at last be deposited within the soil that gave us birth!"

Marriage-Festival of the Greeks in Asia Minor.—At Boudja, a village near Smyrna (says a traveller), I attended a Greek marriage with considerable interest. The ceremony in the church seemed interminably long, and the mumbled prayers and nasal singing (for all the Greeks in this part, whether in church or out of church, when they sing, will sing through the nose) were not very amusing. Both bride and bridegroom wore a wreath of flowers round their heads, which was pretty and classical: these wreaths of flowers were exchanged and re-exchanged many times in the course of the ceremony. They had also *two* nuptial rings, one on the hand of the bridegroom and one on the bride's, which were slipped from one to the other very frequently, the bride now wearing her own, now her husband's, and so on.

The procession returned from the church to the bridegroom's house, preceded by music, instrumental and vocal, and followed by all the Greeks of the village. This procession closely resembled those we see represented in sculpture and on ancient vases, and which refer to the customs of the Greeks two or three thousand years back. Immediately on her arrival at the house, the young bride took her place on a sofa in the corner of the room, and there sat with downcast eyes as immoveable as a statue, taking no part whatever in the amusements that were going on, and never even uttering a word, except in a whisper, to some female relative or dear female friend. She retained the bridal wreath of flowers, over which was hung very gracefully a veil of rose-colored gauze, which fell on either side her head, leaving her face exposed, and reaching her girdle. Besides the colored veil and the wreath, she was further distinguished as a bride by a long bunch of gold tinsel cut into slips, which was attached to her hair, and dropped down as a gaudy ringlet on either side her neck.

The merry company immediately began to dance, and continued from noon till midnight. The room was soon very crowded. Every one, as he went in, advanced to the bride, whose lap (she was cross-legged on the sofa like a Turk) was duly hollowed out for the reception, and gave her a piece of money, more or less, according to the visiter's circumstances or generosity. The bride deposited the money in a small silver box, but neither opened her lips nor raised her eyes. Meanwhile the dance never ceased, or paused but for a minute, new performers supplying the places of such as were fatigued, and keeping up the strange Romaika (the favorite dance of the Greeks), waving, winding, and interweaving their handkerchiefs. When the musicians gave symptoms of flagging, or talked of being tired, some spirited Palikari would step out of the circle of the dance, take a bright *rubich* (a small thin Turkish coin) from his pocket, wet it between his lips, and then, with a smart exclamation, stick it on the forehead of the head performer. This recipe, generally washed down by a draught of wine, never seemed to fail; and on they blend, and sawed, and bawled, with increased vigor. The in-

Tower of Skulls of Christians, on the Island of Gerba.

strumental music was always accompanied by one voice, of whose beauty no much could be said.

These marriages and other merry-makings are nearly always attended by young Greeks of respectable families, who dearly love a dance, no matter whether it be under the roof of a prince or of a peasant. These persons liberally pay the musicians, but it would be out of all character to present the money in any other way than by sticking it on the forehead.

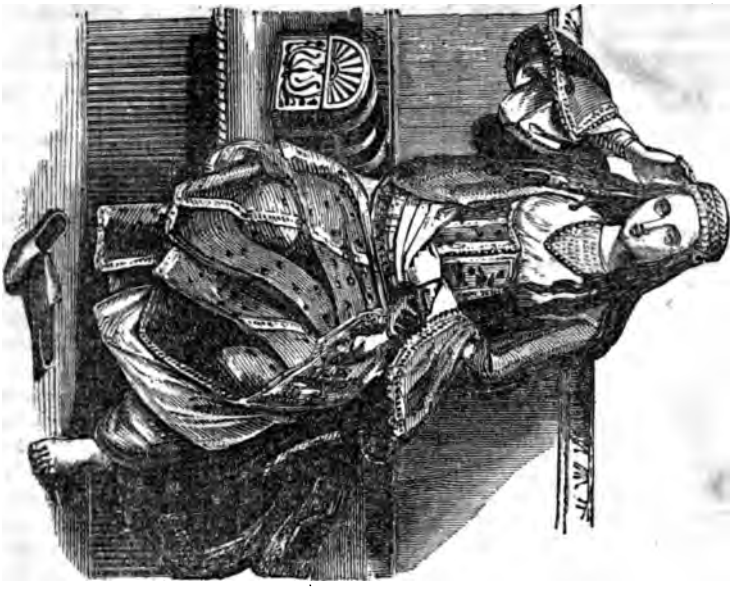
But to return to the marriage at Boudja: what most struck me was the automaton-like passiveness of the bride, who was young, handsome, and naturally lively. But there she sat in the midst of all this dancing, music, merriment, and gossip, close in the corner, like a statue in its niche, without motion, without giving a sign that the busy, noisy scene before her reached either of her senses. And during three mortal days (for so long is the marriage-festival kept up) was she to persist in this unnatural, forced position of stupid decorum, amid the joyfulness of those who were called together only to celebrate her own happiness! This forced delicacy and decorum, and submissiveness on the part of the young bride, must have been mainly borrowed by the Asiatic Greeks from their masters the Turks.

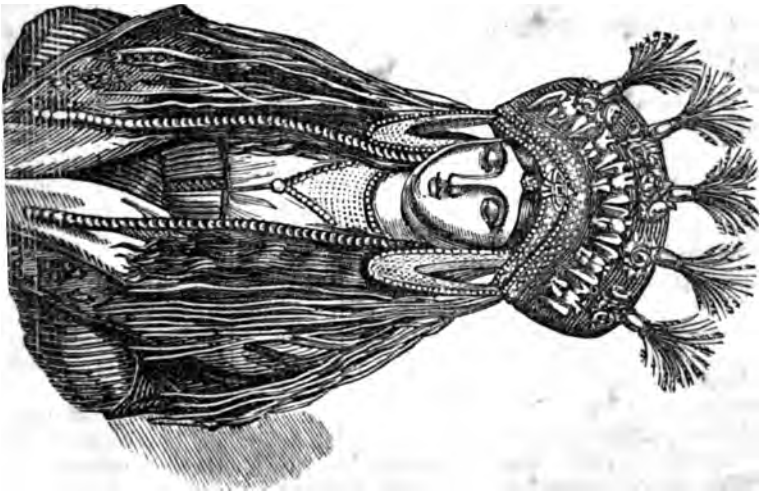
In the evening, about an hour after the candles had been lighted, the wedding repast was served up. This, in truth, was frugal enough: it consisted of a large dish of keskake (a Turkish dish made of unground wheat, mixed with a little maize, butter, &c.), which, among the oriental Greeks, as well as the Turks, is always eaten at weddings, and of a large bowl of pilaff or boiled rice, in which was some mutton hashed. All the females present partook of the hymeneal banquet (except the bride, who tasted nothing), in the upper room, the scene of the dancing—on the floor of which, a carpet being spread, they sat down in the oriental style. They drank no wine. The men retired to a room below, with the bridegroom, who helped them to the same condiments as had been served up stairs; and their repast was finished by the circulation of the wine-cup, in which the health and happiness of the new-married couple were drunk, with the usual wish or prayer never omitted by the Greeks, that no evil eye or other bad influence might interfere with the happy consummation of the nuptials.

As soon as the repast was finished—and it occupied scarcely a quarter of an hour—the carpets were withdrawn, and the dancing recommenced. During a pause in the dancing, two young men and two young women (the latter from the island of Scio, and very pretty) amused the company with singing; and surprise may be excited, considering where they were, in the midst of Turks, by their heedlessness or boldness, when it is mentioned that the themes of their songs were all patriotic—the praises of Ypsilanti, the victories of Colocotroni, the bravery and address of the Turk-burning Canaris, the death of the heroic Marco Botzari, &c.

In the course of the evening the old aghà of the village came in with two of the Turks of his guard. He quietly seated himself on a low chair in a corner of the room, had his pipe lighted, and commenced a process of silent smoking, which he hardly interrupted by a word, except "Atesh" (fire! when his pipe went out, during the two hours he honored the Greeks with his company. His guards, two young *Yebecks*, or mountaineers, from the interior of Asia Minor, stood near the door with dilated eyes and open mouths wondering, no doubt, at the liberty of the Greek women, but evidently delighted with the joyous scene.

I was informed by a young lady (a European present) that the aghà had furnished the materials for the wedding feast. This looked paternal and pretty, but not so the context: he was to receive a large portion of the





money presented to the bride by her friends and visiters! As, beside nearly all the peasants of the village, many respectable young Greeks fro Smyrna were present, and all the Franks who had country-houses ther went, or sent a few piastres, the old Turk must have been a considerabl gainer by the transaction.

This marriage was celebrated, as they nearly all are, on a Sunday. C the Monday and Tuesday following the same amusements were kept up the bridegroom and his friends, male and female, making processions throug the village with music and dancing. The bride was not allowed to go o of the house until the Sunday following.

The great variety of picturesque costume which the traveller meets wi throughout Greece, Albania, the coasts of Asia Minor, and the Levant, ge erally gives a singular charm and interest to his route. In continent Greece, not merely every province, but every district, nay, almost eve town and village, has its distinctive dress: so that when the people are se in crowds at fairs, or any common place of rendezvous, an attentive observ of their costume can tell where they all come from, without reference to an thing else. This is also the case in the south of Italy, particularly in Cal bria, Basilicata, and Apulia, where the whole type of manners and custo is much more Grecian than Italian. In the mountains that back and he in northern Greece, and which are chiefly occupied by tribes descended fro the great Slavonic race, the costume is essentially different from that wo by the Greeks; and this costume, again, is subdivided and modified accor ing to the difference of tribes and clans. The kilt, differing only in col from that worn by the Scotch Highlanders, is common to them all; and t whole dress, figure, and manner of living, of the Arnaouts, or Albanian struck Lord Byron as bearing a striking resemblance to those of the Gae of Scotland. These Arnaouts always wear a red shawl round the hea their neighbors, the Montenigrini, wear a yellow one; and the Chimariot the Gegdes, and other Slavonic tribes, are distinguished, not only by a di ference of color, but also by the fashion of their turbans, and the way which they wear them. They all go armed; and the importance and weal of an Albanian may be estimated by the number of weapons he bears up his person, and the richness of their mountings and inlayings in silver, gol and precious stones. The chief of a clan is frequently seen thus accoutre his long-barrelled, slim-stocked gun in his hand, four mounted pistols in h girdle, a sabre by his side, a large horn for powder, and a cartouch-box slu over his shoulder, a yataghan, and a short dagger stuck in his girdle to ke company with his pistols—in short, he is a walking mass of arms; an though rude, undisciplined, and not worth much in an open field again regular troops, he is a dangerous enemy to encounter in irregular mountai warfare. His taste for dress is almost as expensive as that for arms: loose jacket is generally richly embroidered in gold; and the gyves, whi descend from the knee to the ankle, and the massy clasps that fasten on h buskins or sandals, are pretty generally of the same metal, or at least rich ornamented with it. The color of the kilt is white among all the tribe and, however dirty may be the shirt, which is very seldom changed, it is t special care of the Albanian to keep the kilt spotless as new-fallen sno A good deal of this care is also extended to the sheep-skin capote, which worn, in a most graceful manner, over the right shoulder. We have be treating of a man of importance; but all ranks of Albanians have a passi for dress and finery, and, when not absolute paupers, contrive to go smar attired and armed. The long gun is even more indispensable than the pi to the Turk, or an umbrella to an Englishman in rainy weather. "T

weapon," says Mr. Hobhouse, "is to be found in every cottage in Albania: the peasant carries it with him either when he tends his flocks or tills his land. It is the weapon in which he considers himself to excel, and he regards it both as his ornament and defence. The gun-barrels, however, are thin and ill made, and the locks are of the rudest manufacture, the works being generally on the outside. Owing to this circumstance, and as the powder is large-grained, and otherwise very bad, the Albanians are not good marksmen, although they never fire without a rest, and take a very deliberate aim."

Albanian Officer.

We fancy that, as marksmen, the Albanians vary in ability, for we saw some clans at Constantinople that fired with admirable precision. We believe, however, that the powder furnished them by the sultan was English. Their mode of practice was this: they built up a tambour of loose stones, between three and four feet high, like those the Greeks loved to fight behind during their late war, and then, dropping on the knee, rested the barrel of their piece on a stone, and fired, after taking a cool aim. Some of these fellows were about the finest specimens of limb, make, and feature, that we ever beheld; but there is an expression of cunning and ferocity in the Arnaout countenance which renders it disagreeable. Many of them, from the snowy mountains of Albania and Thessaly, were fair in complexion: some of them had light-brown hair, and not a few sandy-colored hair. They wore no hair at all on the fore-part of their heads, but suffered it to flow down behind, in large quantities, from the top of the crown; it was generally in curls, but they are said to admire it most when straight and long. These hardy mountaineers, who were then about to take the field against the Russians, evidently carried their fortunes on their backs, for every one of them had some gold or silver worked in his jacket or vest. As they are almost constantly at war, and as property is very insecure in their own turbulent country, we believe

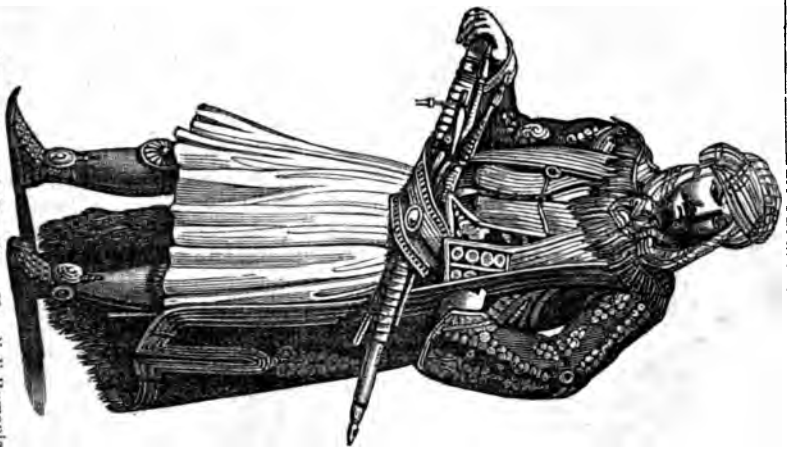
this portable, succinct mode of investing it, which also obtains among the Turks, is almost general among them.

At Smyrna, we had an opportunity of watching the proceedings of two Albanians, who had recently left the service of the pacha of Scio. With their heads turned with the comparative freedom of that great seaport, they plunged into all the dissipations it afforded, their main and capital pleasure, however, being drinking the rum and brandy carried thither by foreign ships. They had little or no money, but they paid their way in uncoined metal: one of them had a small gold chain, of which he cut off so many links a day, according to their expenses, as long as it lasted. When this was drunk out they drew upon the mounting and inlaying of their yataghans and pistols; and when that resource was exhausted, they began to strip the embroidery from their clothes. At last, having fairly drunk all the gold and silver off their backs, they girded up their loins, slung their guns across their shoulders, and took their way into the interior of the country, to seek service from the Turkish governor of Magnesia. The only things of value they had left untouched when they departed from Smyrna were the silver mountings of their guns.

The Albanians have the practice, so common among sailors and people of various nations, of making figures on their arms and legs, by punctures which they color with gunpowder. The custom is ancient, for Strabo informs us it was prevalent among the Illyrians. They are so fond of going smart, that nearly every man among them is an adept in tailoring, and can make his own clothes. In passing an Albanian corps-de-garde, we have often been amused by seeing a sturdy, fierce-looking fellow, armed to the teeth, plying the needle with wonderful activity, and cutting and patching with the address of a professional schneider. They almost invariably carry about their persons a small quantity of cloth, red leather, catgut, some thread, and a large needle. These articles are usually wrapped up in part of the pouch which contains their cartridges. But there is another operation one is apt to see on passing their stations, which is not so agreeable to the eye. Though so fine, they are very filthy: they generally wear their shirts and under vestments till they rot on their skin, and they swarm with vermin, which they pick from themselves or from one another in public. In addition to the red cloth skull-cap, which in form resembles the cup of an acorn, those who can afford it wear a shawl bound round the head in the turban fashion. In cold weather they draw the ends of this shawl over the ears and tie them under the chin, as will be seen in the opposite engraving.

This figure represents an Albanian soldier in all his glory; and in the days of old Ali Pacha there was a strong corps of janizaries in his capital equally well dressed and splendidly appointed: the bosses on their knees and ankles were of silver filagreed, the bottom of the sandal of goatskin, the open work at the top of catgut, studded with small silver stars. The aghas and the superior officers of the Albanian janizaries were wont to have their jackets made of rich velvet, and so inlaid with gold or silver that they had almost the stiffness of a coat-of-mail. "The whole Albanian costume," says Mr. Hobhouse, "when quite new and clean, is incomparably more elegant than any worn in the Turkish empire." And to this we may add that it has served as a model to several others of the sultan's former subjects, particularly to the Greeks of the Morea and Maina, and the mountaineers of Candia, who have copied it more or less closely, but confined the use of it to men of martial occupations.

Every Turkish pacha or mootzellim of any importance has, or at least used to have a few years ago, a set of fierce-looking Albanians for his body-guard.



Greek Officer of Nauplia, or Napoli di Romania.

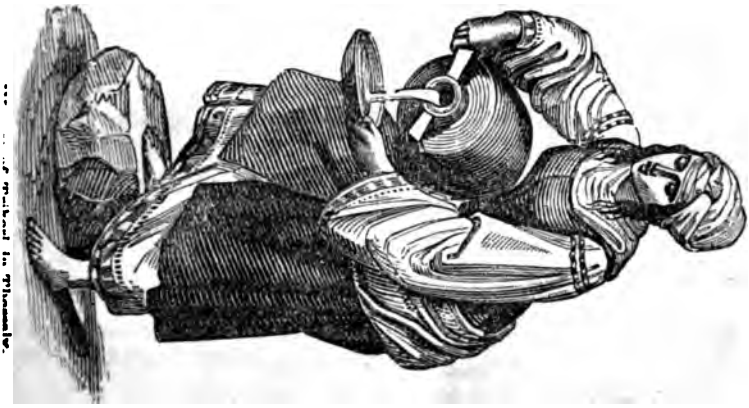
Albanian Janizary.

In this way they were scattered thickly over the whole of continental Greec with the exception of the country of the Mainotes—a people as fierce a warlike as themselves. The partial adoption of their costume by the Gree may have arisen from this circumstance, but it remains to be mentioned th many colonies of Albanians who, though they have lost the language a speak Greek, retain the dress, manners, and features, of the great Slavoı stock, have been settled for many ages in the plains of Greece. Thessa Bœotia, Attica, and the eastern Morea, have long been full of their village and the men of the island of Hydra, who took so active and so noble a p in the late wars against the Turks, are of Albanian and Slavonian desce and wear the Albanian dress. Moreover, the Hellenic or true Greek bloc which must be looked for in its purity in the islands of the Archipelago, h been mixed up, by intermarriages with that of the Albanians, in a large p of the country, and hence would naturally arise a fusion of manners, custon and dress. There may have been some other causes besides good taste, whi would naturally give preference to such a costume: but this fact is certa that most of the armed Greeks we met during the late war of independen wore the white kilt, and nearly all the rest of the Albanian dress, which w also adopted by the English general Church, when he took the command the Grecian army.

In the engraving of the Greek officer of Nauplia (p. 71), there is no sheepsk capote, but we have frequently seen it worn, by both officers and men, amo the Greeks. In the groups of islands, the Cyclades and the Sporades, t Albanian kilt was less rarely seen; but there, as on the coast of Asia Min and at Constantinople, the Greeks wore loose trowsers like the Turks, h dyed blue, and had Turkish morocco boots and slippers over them inste of the buskin or sandal. This was also the case with the non-military Gree in the Morea. The Turks prohibited them all the use of yellow slippe and made them (under penalty of a bastinading) wear black or dingy-color ones. This exclusion and humiliating distinction was a constant source irritation to the Greeks, and boots and slippers had more to do in bringing abo their revolution than some philosophers would imagine.

The passion for dress and finery is common to the whole Greek race, hi or low. The costume of the capitani, or feudal chieftains of the mountaino and always-independent country of Maina, is or was very splendid and grac ful. Mr. Morrit, in describing one of these capitani, says: "He wore a clo vest with open sleeves of white and gold embroidery, and a short black-velv mantle edged with sables. The sash which held his pistols and his poigna was a shawl of red and gold. His light-blue trowsers were gathered at t knee, and below them were close gaiters of blue cloth with gold embroider and silver-gilt bosses to protect the ankles. When he left the house, he flu on his shoulders a rich cloth mantle with loose sleeves, which was blue wit out and red within, embroidered with gold in front and down the sleeves the most sumptuous manner. His turban was green and gold. . . The dre of the lower orders is in the same form, with the necessary variations in t quality of the materials and absence of the ornaments. It differed conside ably from the Turks, and the shoes were made either of yellow or untann leather, and fitted tightly to the foot. The hair was never shaved." T Greek females are celebrated for their love of finery and of varied attire, may be seen in the cuts.

Scio, which stands at the mouth of the gulf of Smyrna, is one of the plac distinguished for its Greek costume. In the happy days of that island, befo the destroying hand of the Turk passed over it (in 1822), all classes of Gree there dressed with exceeding elegance, for trade and industry had introduc



... of Thibet in Thibet.

a general prosperity, and good taste seems to be inhaled with the] of the ancient Ionia. Nowhere in the Levant was there so much ho and gayety—nowhere was the Romaica (the Dædalian dance descr Homer) danced so frequently or so well. All travellers were struck exhibition of happiness. Dr. Chandler, who visited Scio in 1760, with much complacency on the subject: he mentions the beauty of men, their gay dresses, their turbans made of linen so white and thin seemed snow, their short petticoats reaching to the knee, with the wl hose beneath them, and he praises their frankness and cheerfulness. were sitting at the doors of the houses knitting and spinning, and cou saluted the traveller as he passed. Another classical traveller, the la F. S. North Douglas, who saw them on a holyday, has left a descri their dance, which is very correct and better than any other account Romaica we are acquainted with. He says, "I never shall forget t time I saw this dance: I had landed on a fine Sunday evening, in th of Scio, after three months spent amid Turkish despotism, and I fou of the poorer inhabitants of the town strolling upon the shore, and t absent at their farms; but in riding three miles along the coast to vis is falsely called the 'School of Homer,' I saw about thirty parties e in dancing the Romaica upon the sand. In some of these groups t who led them chased the retreating wave, and it was in vain that lowers hurried their steps—some of them were generally caught by turning sea, and all would court the laugh rather than break the indis chain. Near each party were seated a group of parents and elder who rekindled the last spark of their expiring gayety and vigor in the ness they saw around them. . . . . The shield of Achilles presents the image of this Grecian festivity, which has been continued in all its to this day:—

"'A figured dance succeeds: such once was seen
In lofty Gnossus, for the Cretan queen
Formed by Dædalian art: a comely band
Of youths and maidens, bounding hand in hand,
The maids in soft cymars of linen drest,
The youths all graceful in the glossy vest;
Of those *the locks with flowery wreaths* enrolled,
Of these the sides adorned with swords of gold.
That, glitt'ring gay, from silver belts depend.
Now all at once they rise, at once descend,
With well-taught feet, now shape in oblique ways,
Confus'dly regular, the moving maze:
Now forth at once, too swift for sight, they spring,
And undistinguished blend the flying ring;
So whirls a wheel, in giddy circles tost,
And rapid as it runs the single spokes are lost.'

HOMER: ILIAD, book xviii.

"Graceful and splendid as this poetical description is, it loses noth reality. The Romaica, the usual dance of the islanders in the Archi has thus been faithfully represented by Homer, and any account whicl give of it will be little more than a feeble copy of the beautiful pict has drawn.

"Whether they meet within the corridor of the house, or around s vorite well and agiasma (holy fountain), no evening passes, in the s months, that the young people of both sexes, adorned with all the finery of garlands and flowers, and their hair floating in primitive lux on their necks, do not assemble to dance the Romaica. The music ge consists of violins and rustic pipes, and the time begins by slow and notes, and increases, with the spirits of the dancers, into the most liv

measures. They move, holding each other by the hand, in a circle, alternately of young men and girls; and the dance is led by some osen from the rest for her grace or beauty, who holds one extremity kerchief, while the other is in the hand of the Poryphæus of the

begin in measured and slow steps till they have gained the time, egrees the air becomes more sprightly; the conductress of the ietimes darting to her partner—sometimes darting before the host, ng them through the most rapid evolutions; sometimes crossing hands which are held up to let her pass, and giving as much live- l intricacy as she can to the figures into which she conducts her ns, while their business is to follow her in all her movements with- ing the chain or losing the measure. * * * This Cretan dance osed in imitation of the labyrinth of which the same Dædalus was and it expresses fairly enough by its windings the intricacies of rated cavern. The evolutions, also, which resemble the order in light of cranes follow their conductor, have given it, not unaptly, of Γεράνος—the crane."

ı the dance that the costume of the Greek islanders is seen to ntage, and nowhere were the "flowery wreaths" to entwine in furnished so abundantly as at Scio, the whole eastern face of which nplete garden. There were the sweet blossoms of the lemon, the nd the citron trees, and glorious rose-bushes—and jasmines, car- nd myrtles, were interspersed with olive and palm-trees, and cy- We visited the island in the days of its desolation, but these lovely still remained, though "gone were the hands that culled the flow- l we had not the opportunity of witnessing the Homeric dance in which was the old poet's birthplace, or which, at least, is one of ants to that honor.

IRCASSIANS.—There are two ranks of princes among the Circas- e Khanuks, who are not very numerous, and the Ptschi. The sec- consists of nobles who acquire great power by their alliance with hed families; the latter are hence called Vorks, or Usdenes, and, rinces, enjoy the privilege of wearing red shoes. The condition sals is pretty much the same as that of the vassals in Europe du- niddle ages. They live from father to son in dependence upon the ose land they cultivate in peace and defend in war. Each of esses land and cattle of his own, to which the prince has no claim; as the latter any authority over his vassals or their families, so that e dissatisfied with his service they may leave him and settle else- A prince may sell his vassals only by virtue of his right of inflict- hment, and in this case the matter must be determined in a public . These classes are but little distinguished by difference of dress tic manners. To the above classes we may add a fourth—that of taken in war; these they either sell to the Turks, or retain for es, and their children become their vassals. The number of Rus- prehended in the latter may amount to about three thousand. All who fall into the hands of the Circassians, and who have no Ko- patron,* go into this class, and are treated with much humanity. ery remarkable that the Circassians, who possess so many slaves

gular custom exists among several other uncivilized nations. In conformity with it a lling into Circassia immediately selects a Konack, whose name is sufficient to secure to isite protection. From this instant he is considered responsible for all the acts of his om he shows the greatest hospitality, and whom he defends against all assailants.

of their own, and value liberty as the highest of all blessings, should nevertheless consent to the sale of their own children. A father may sell his offspring; a brother his sister, if his parents are dead; and a husband his wife, if she has proved unfaithful. Beautiful girls are often exceedingly anxious to be sold, as they are sure of being taken into a Turkish harem, a mode of life which the Circassian women prefer infinitely to their own domestic customs. It sometimes happens that these Circassians, after obtaining their freedom, return to their own country, where their recitals of the delights of the harem, and the sight of the presents they bring with them, decide the fate of many young girls who have entertained a wish to be sold. Very few of the princes ever sell their children.

Though the Circassian women are condemned to a very laborious life, they are not, as in Turkey, doomed to a perpetual seclusion. The young women are always invited to the feasts, which they enliven by their sprightliness.

Among no nation is the pride of nobility carried to a greater extreme. A prince never marries any but a prince's daughter, and his illegitimate children do not inherit either the title or privileges of their father, unless they are married to a princess, by which they are admitted into the rank of princes of the third class. On occasion of a birth in a prince's family, great rejoicings take place. If it is a son, the father, on the third day after his birth, intrusts his education to one of his nobles, who naturally covet this distinction. He is committed to the care of a nurse, who gives him his name; at the age of three or four he is circumcised, when the Mollah is presented with a horse. The father does not see his son till his marriage, a custom which naturally produces great coldness between the nearest relations. The sons of the nobility reside in their father's house till their third or fourth year, when they are placed under the care of a tutor, who is not obliged to be of equal rank. He receives no remuneration, but if he continues to reside with his pupil after he is grown up, he is entitled to the best of all spoils taken in war or predatory excursions. The choice of a wife, too, is generally made by the tutor.

Upon the death of the head of the family the management of the property, which is not divided, devolves on the mother. On her decease the wife of the eldest son takes her place; and if the brothers wish for a division of the property the eldest receives the largest, and the youngest the smallest portion. Natural children have no claim to the inheritance, but they are generally supported by the family.

As soon as a young man has made his choice of a wife, he must agree with her father on the price he is to pay for his daughter. This is commonly a coat-of-mail, swords, muskets, horses, and oxen. As soon as the treaty is concluded, the young man, attended by a friend, comes to fetch his bride, whom he places behind him on his horse. They then proceed to the house of an acquaintance, where the friend introduces the bride, who is then conducted into the apartment assigned to the young couple. Here she waits while her intended husband lights the fire. When all the family have retired, the friend goes in search of the bridegroom, who has, in the meantime, made his way into the forest. Before the new-married pair go to rest the bridegroom cuts the laced boddice which the bride has worn ever since her fifth or sixth year, with his dagger. It is made of morocco furnished with two flat pieces of wood, which so completely confine the bosom that it has no room to expand, as none but married women are permitted to go without corsets. This Circassian boddice encloses the whole body from the collar-bone to the hips, and is fastened by lacings which are passed

through leathern thongs; for these, silver hooks are sometimes subs
It is worn even at night, and is never taken off but to be replaced
other equally small when the former is quite worn out, so that the a
ance of a Circassian girl on the day of her marriage is precisely th
as in her sixth year.

No other ceremonies except the customary entertainments tak
on occasion of a marriage. At daybreak the following morning the h
quits his wife, upon which she removes to a house which her husba
built upon his own property, where he sees her only at night, or un
veil of the greatest secrecy, it not being considered decorous to appe
licly with his wife. If the husband is rich he immediately pays his
in-law the price of his wife, otherwise he does so by instalments,
sometimes run on for several years. There is much that reminds
antiquity in all their customs.

The wants of every family are supplied by the industry of the d
members. The women employ themselves in weaving a light n
resembling flannel, while others again manufacture the Burkra (whi
cloaks), saddle cushions, linens, coats, shoes, ribands, braces for s
muskets, and pistols, &c. Like the princesses in Homer, the noble
of Circassia are obliged to perform these labors, in which they pride
selves, as they distinguish them from their vassals. The men perf
kinds of carpentry, make stocks for their guns, cast bullets, prepare
ble gunpowder, and tan very bad leather, as they only rub the skins b
two pieces of beech-wood. Smiths and jewellers are the only
branches of labor; the former make arms, axes, nails, &c. The
part of the iron for the arrows, and the fine work of their beautiful d
is the work of the Kumucks, a distant tribe. The jewellers ornam
arms, powder-flasks, and girdles, with silver.

The Circassians buy the barrels of their guns and pistols from the
and put on stocks of their own make; many of their arms are of Eu
manufacture, particularly Genoese and Venetian swords. Of the
weapon many are extremely old, having been taken out of the tombs.
helmets, coats-of-mail, and bows, are obtained either from Persia o
stantinople. They are very rarely sold, and those which are once i
possession descend from father to son, as they constitute the chief
of a family.

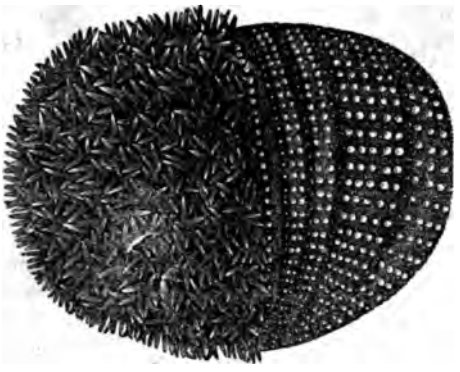
Rocking Stone, Fall River.

SUBJECT III.

THE DISTRIBUTION OF ANIMALS.

HAT department of animated nature upon a view of which we now enter, presents to our attention a wide diffusion of its objects, variety of organisms, and gradual advance from the most simple to the more perfect and majestic forms, together with a precise adaptation to different external circumstances. The high ice-clad mountains, the level and parched deserts, together with the "deep unfathomed caves of ocean," have their respective animal tribes; while the bowels of the earth are not devoid of locomotive tenants, as in the case of the caverns of Carniola, where the *proteus anguinus* sustains existence in the perpetual darkness, writhing and languishing upon any transition to the realms of day, without some protection from the light; and of the mammoth cave of Kentucky, where the eyeless fish sports blindly arkness. The study of animals, as evidenced by observation, h Aristotle, although it formed an accomplishment of the Jewak "not only of the trees, from the cedar of Lebanon even to ch springeth out of the wall," but also "of beasts and of fowl, g things and of fishes." But from the time of the celebrated nce of zoology made little progress, till Ray addressed himdical arrangement of animals, founded upon their difference of riginated a system which Linnæus expanded and improved, uvier to rearrange and perfect. The more recent results obiefly been an extension of the sphere of vitality by Ehrenberg's eries on the demeanor of minute life in the ocean, which have knowledge a thickly-peopled world of microscopical living eanic abyss, some of which have but the estimated diameter ousandth of a line.

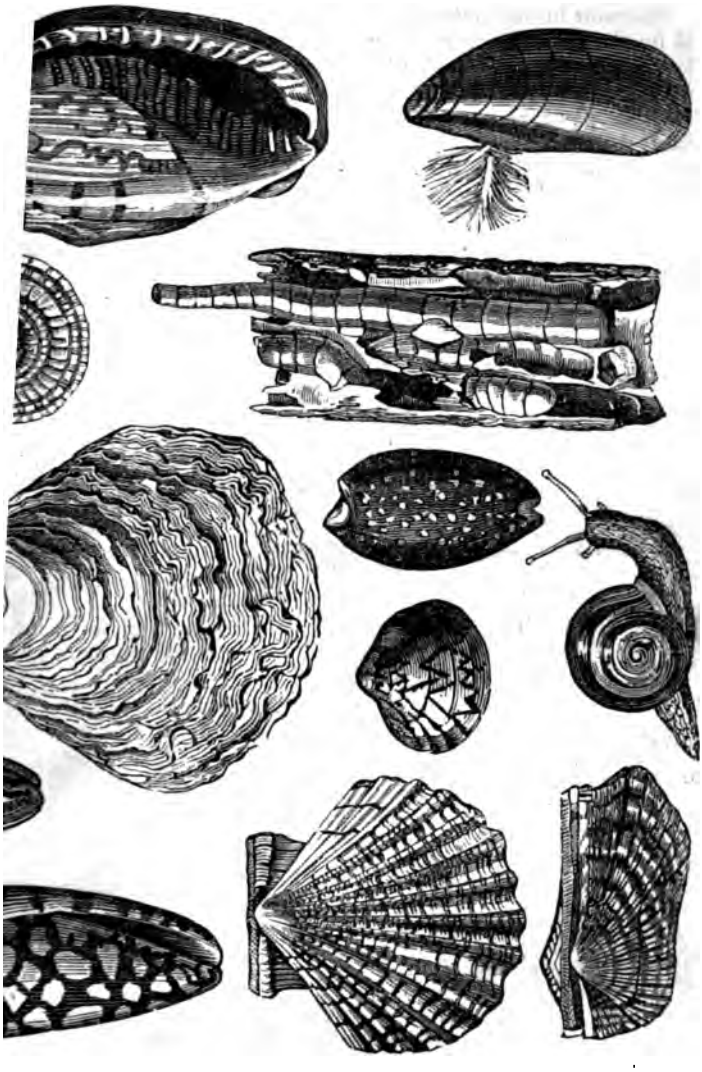
surveying the distinctive characters of the animal races, it is the series ascending from the lower to the higher organizations. *Zoophytes*, or plant-animals, may be regarded as forming the chain of animal life. It includes several families whose mem- are aggregated in a common living mass, as the buds of a diree are united to the stems. This is the case with the tribes h have their special habitation in the equatorial seas, and there ral reefs and islands. In the *infusoria*, or animalcula, chiefly nt fresh water filled with vegetable matter, and in common l individual existence is developed, but so exceedingly minute capable of being traced except with the aid of a microscope.



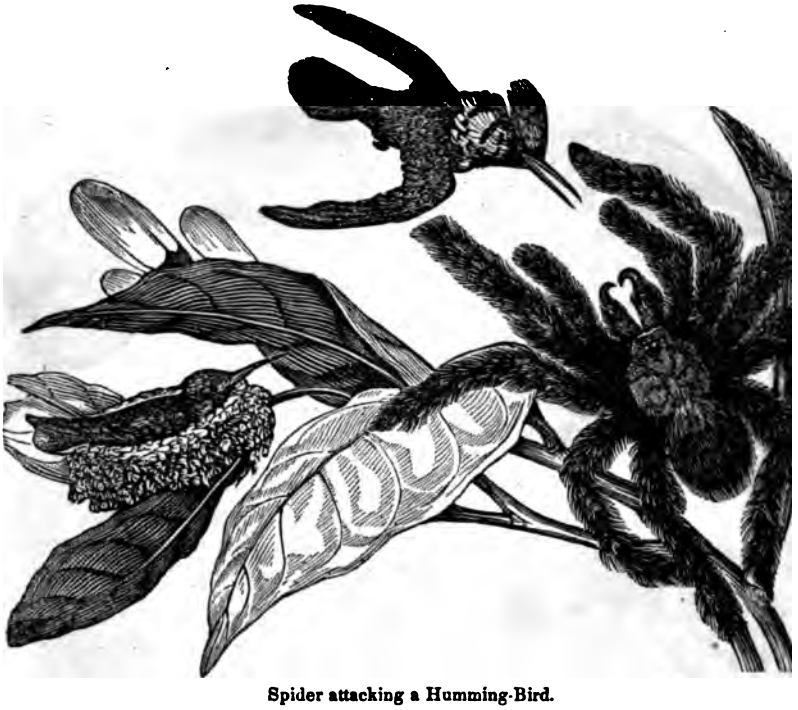
The Sea-Urchin.

The brown-colored, fine dust, so often noticed in the Atlantic, which has fallen in such quantities upon vessels as to soil everything on board, and even cause them to run ashore on account of the obscurity of the atmosphere, consists principally of infusoria. Some of the species multiply at a prodigious rate; for Ehrenburg calculates that, in twenty days, a single individual may increase to a million. In the class of *mollusca*, whether naked or testaceous, that is furnished with a shelly covering more or less thick and entire—as in the case of the oyster lobster, and crab—a well-defined individual existence appears. This order is very extensively diffused but several species are exclusively confined to particular seas, the pearl-oyster only arriving at perfection in the equatorial ocean. The Indian and the Mediterranean seas are the chosen haunts of the *pinna marina*, whose filaments rival in appearance the most glossy silks. Different kinds of shells are found on the shores of South America and New Holland; also in each of these districts with a change of latitude; and the tropical forms are distinct from those of extra-tropical situations. The natural distribution has, however, been interfered with by accidental causes; for many molluscæ, adhering to the bottoms of ships, have been transported to foreign parts of the ocean, which have become peopled with new species. Thus the shelly ship-worm, *teredo navalis* (p. 81, Fig. *a*), so peculiarly destructive to vessels, boring with ease and rapidity into the stoutest oak planks, has in this way been conveyed to the waters of Australia. Some unknown cause brought great numbers in the years 1731 and 1732 to the banks of Zealand, and excited the fears of the Dutch for their piles; but they departed without doing much mischief, probably to seek a warmer temperature.

A further advance in ascending the scale of animal existence, brings us to the *insect* tribes, some of which are extensively disseminated; as gnats, bees, and flies. The thistle-butterfly, *la belle dame*, is common in Sweden, throughout midland and southern Europe, and found also at the cape of Good Hope. Others, as Prichard observes, are especially limited in the sphere of their existence by the presence of particular plants, which afford them habitation and sustenance; and in general, where countries are separated by great distances, though their temperature and soil are the same, the insects inhabiting them are of different species. Those occupying the eastern parts of Asia, are dis-



tinct from those met with in Europe and Africa under the same parallels latitude; and a similar difference is observable upon comparing the entom ogy of the old and the new continents, though both have species in comm while Australia presents forms peculiar to itself. It is in the torrid zone the earth, where the air is humid and the vegetation rank, that we have t most intense, splendid, and at the same time annoying development of ins life. By day, in countless numbers, and adorned with the richest colors, b terflies sport in the sunbeams; and by night the tropical forests are illumi ted by the green light of myriads of fireflies—a family which includes glow-worm of our climate, most brilliant when disturbed and irritated—wh give to the woods the appearance of a natural Vauxhall. "It is snowi butterflies!" was a remark of a seaman of the Beagle, when off the coast South America; for flocks consisting of many myriads extended as far as eye could range; nor, with the help of a telescope, could a space be disc ered free from their presence. As the atmosphere was perfectly calm, th had evidently left the shore upon a voluntary excursion. But in these co tries several of the insect races are a source of severe suffering to the hum inhabitants, on account of their venomous qualities, their immense swar the pertinacity with which they assail the person of man, or their rapac in consuming the fruits of the earth. The spider of Guiana will even sin



Spider attacking a Humming-Bird.

attack birds with success: and the termites, or white ants of India and Afri will penetrate the beams of houses; destroy timbers, chests, books, and c thing, in a few hours; or, by excavating beneath the dwellings of the inh itants, render them insecure. Though only about a quarter of an inch length, they erect pyramids to the height of ten or twelve feet, sufficien compact to sustain the weight of several men, dividing them into numer

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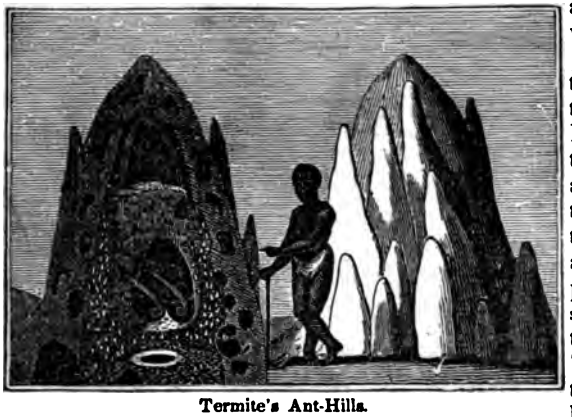
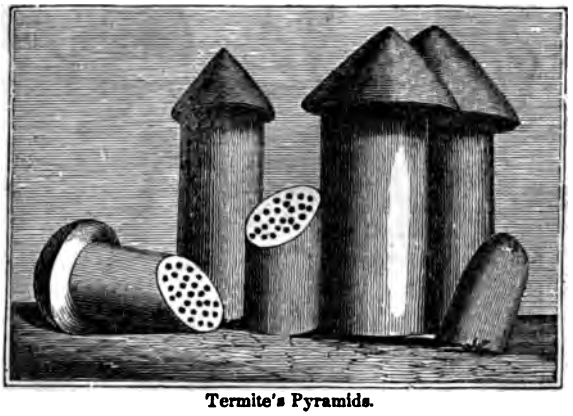


Termite's Ant-Hills.

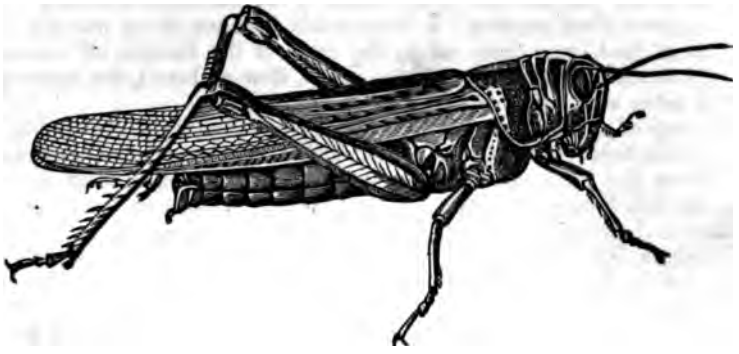


Termite's Pyramids.

apartments—far more wonderful works, in proportion to the size of the animal architect, than the pyramids of Egypt. The musquitoes by day, succeeded a little before sunset by the tempraneroes, and the zancudoes by night, are, however, the most painful and unceasing scourge of man in the torrid zone of America. They are rarely found on the elevated table-lands, but in the valleys, as well as in most places along the coasts, the lower stratum of the atmosphere is frequently so completely occupied by them to the height of twenty feet, as to assume the appearance of a dense cloud of vapor. It is a remarkable feature of their distributions, that while they avoid dry and unwooded situations, and chiefly haunt the banks of rivers, they shun those streams which have what the Spaniards call black waters, *aguas negras*, or water of a yellowish-brown color. Insect life is also rife in high latitudes, the heat of the short polar summer calling forth in the arctic region of Greenland and Lapland, an army as innumerable as the heat of the equator, and of an analogous annoying species.

Several of the insect races are eminently gregarious, associate in numbers inappreciable, and unitedly migrate under the influence of some casual pressure, the quest of food. Hence the vast armies of the eastern locust, *gryllus migratorius*, which from time immemorial have been regarded as an avenging scourge, stripping large territories of every particle of verdure, and passing on in a dark and overwhelming cloud to blast the expectations of the husbandman, whose fields are preparing for the harvest.

Instances are numerous of extensive and dreadful devastations occasioned by the multiplication and migration of the individually feeble locust. St. Augustine mentions a famine in Africa, produced by the consumption of every green thing, during which upward of half a million of human beings were cut off in the kingdom of Massanissa alone. In 677, Syria and Mesopotamia were overrun by these insects. In 852, immense swarms took their flight from the eastern regions into the west. They destroyed all vegetables, not sparing the bark of trees, or the thatch of houses, devouring the corn so rapidly, that, upon computation, a hundred and forty acres in a day perished

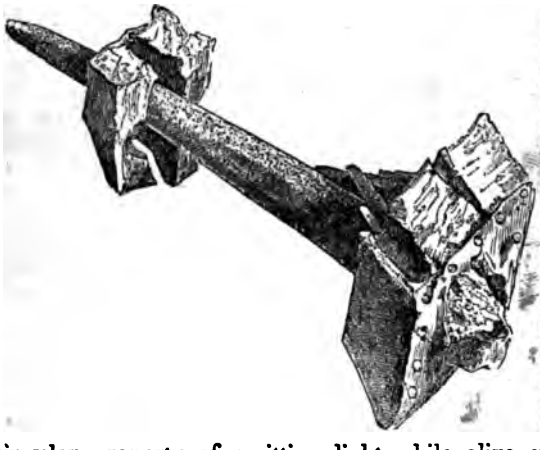


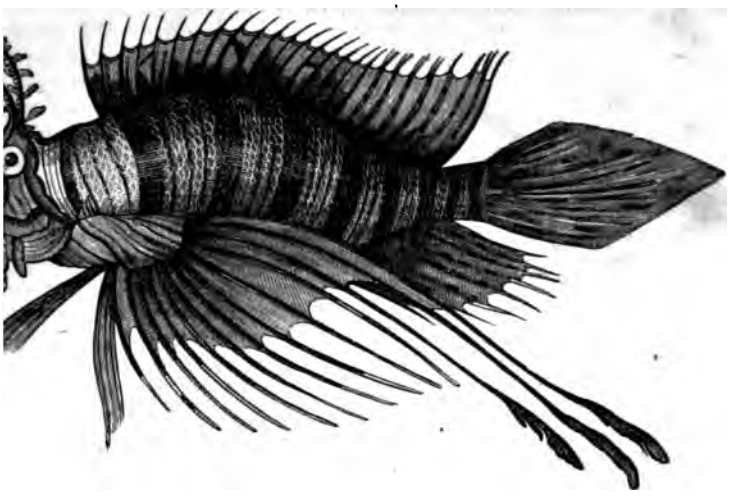
The Locust.

heir daily marches or distances of flight were regulated by leaders, who ew first, and settled on the spot which was to be visited afterward by the hole legion. At length, the locusts were driven out to sea by the force of e wind, and died in its waters; but being thrown back by the tide upon e shores, a pestilence was caused by the effluvia arising from their remains. 1271, all the corn-fields of Milan were destroyed; and in 1339, all those Lombardy. In 1541, an incredible host afflicted Poland, Wallachia, and e adjoining countries, darkening the sky with their numbers, and ravaging l the fruits of the earth. A species of locust, closely resembling the gryllus igratorius of the east, appears in South America, under analogous circumnces. "We observed," says Mr. Darwin, speaking of the passage of the rderilla of Chili, "to the south a ragged cloud of a dark reddish-brown lor. At first, we thought it was smoke from some great fire on the plains; it we soon found that it was a swarm of locusts. They were flying northrd; and with the aid of a light breeze, they overtook us at a rate of ten or een miles an hour. The main body filled the air from a height of twenty et, to that, as it appeared, of two or three thousand above the ground; 'and e sound of their wings was as the sound of chariots, of many horses runng to battle;' or rather, I should say, like a strong breeze passing through e rigging of a ship. The sky, seen through the advanced guard, appeared e a mezzotint engraving, but the main body was impervious to sight; they ere not, however, so thick together, but that they could escape a stick waved ckward and forward. When they alighted they were more numerous than e leaves in the field, and the surface became reddish instead of being green; e swarm having once alighted, the individuals flew from side to side in all rections. Locusts are not an uncommon pest in this country; already, dug this season, several smaller swarms had come up from the south, where, apparently in all other parts of the world, they are bred in the deserts. e poor cottagers in vain attempted, by lighting fires, by shouts, and by ving branches, to avert the attack." The force of the wind frequently ocsions the involuntary migration of insects. When a strong gale blows ward the sea, and the shore is unprotected by trees, vast numbers are driv- to a distance from their home, either to perish in the ocean, or to gain a tlement in some contiguous island or continental region. In this way, the semination of the insect races has, no doubt, been largely promoted. hen the Creole frigate was lying in the outer roads of Buenos Ayres, in 19, her decks and rigging were suddenly covered with myriads of flies and ins of sand, which the breeze had borne from the coast, and so disfigured

were the newly-painted sides of the vessel by the multitudes adhering to them as to require a fresh coating. A remarkable instance of an insect at a dis tance from land, was observed by the crew of the Beagle, off the coast o Africa, when a large grasshopper, *acrydium*, flew on board, the nearest poin of land being nearly four hundred miles distant.

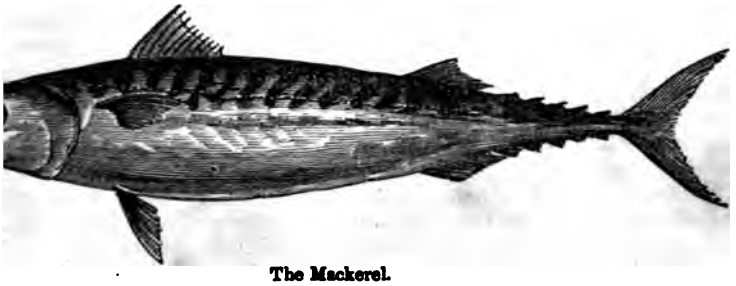
The class of *fishes* offers many remarkable peculiarities to our notice; and perhaps this department of the animal kingdom presents greater variety of form, from the beautiful to the grotesque and monstrous, than any other. Some species, as the common pike, attain an age surpassing that of the longest-lived land animals. The individual taken at Kaiserslautern in 1754, which was nineteen feet in length, had been put into the pond of that castle by order of Frederick II., with a ring fastened to the gill-covers, bearing the date of 1487, so that the fish was more than two and a half centuries old at the time of the capture. Though low in the scale of existence, several varieties show a capacity for instruction, and have been trained to recognise their names, making their appearance when summoned by them. Lacépède mentions this fact, in relation to some fish, which, for more than a century, had been kept in the basin of the Tuilleries; and in some parts of Germany, trout, carp, and tench, have been taught to come for their food by the ringing of a bell. While some tribes are sluggish, and appear to love repose, leading a meditative life in the waters, the herring rivals the swallow in activity and speed, rushing through the deep at the rate of sixteen miles an hour. While many also seem perfectly defenceless, there are several species armed with formidable weapons, which are wielded with tremendous power, as the teeth of the shark, and the snout of the *xiphias* or sword-fish. This latter inhabitant of the ocean is well known to have endangered an East Indiaman, by driving his long serrated snout through the hulk of the vessel, which might have foundered, but for the sword being driven with such force into the timbers of the ship that the fish could not extricate it so that no leak of any consequence ensued. A piece of the hulk, with a part of the fish's sword imbedded in it, is now among the curiosities of the British Museum. Other tenants of the deep have the same singular property of emitting light while alive, which belongs to the tor and irregular particles of gelatinous matter with which the ocean is charge —their dead and dismembered relics the common cause of the phosph rescence of the sea. Besides the bright-green sparks with which the wave are observed to scintillate, which are due to decomposing organic particles, o to minute living crustacea, circular and oval patches, from two to four yard in diameter, with defined outlines, shining with a steady and pale light, ar often remarked in certain oceanic localities, indicating the presence of the su or the moon fish, which is so called from the object resembling a reflectio of either of these luminaries in the water, though neither may be seen in th heavens. Some fishes display the curious power of shooting at the insec





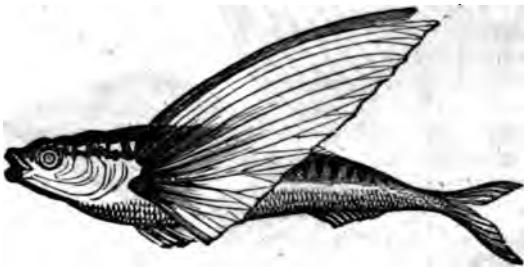
The Scorpion-Fish.

The Salmon.



The Mackerel.

upon which they prey with a drop of water, thereby encumbering their wings, and bringing them within reach. The *chætodon rostratus* performs this feat with surprising accuracy, striking a fly winging its flight over the surface of the sea, or resting upon an aquatic plant at the distance of from three to six feet. But among the most striking of the finny tribe is the *exocœtus*, or flying fish, which has the power of raising itself out of the water, and continuing suspended for a season in the air, beyond the reach of the pursuing dolphin, presenting one of the most interesting and novel spectacles which the tropics unfold to the eye of a stranger.



The Flying-Fish.

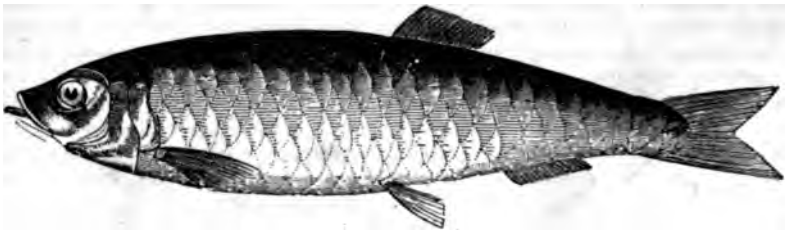
No property of the inhabitants of the waters is more extraordinary than that possessed by various species, of inflicting an electrical shock so severe as to produce exhaustion and numbness of the nerves exposed to its action. The torpedo of the Mediterranean exhibits this wonderful power, which was well known to the ancients, and is often referred to in their writings. Thus Appian tells us that the animal, conscious of his latent faculty, when caught by a hook, exerts it in such a manner, that, passing along the line and rod, it benumbs the astonished fisherman, and suddenly reduces him to a state of helpless stupefaction.

Though this is an exaggerated picture, it is still true that an electric shock is equally inflicted by the torpedo, whether the fish is touched by the naked hand or by the medium of a stick. The trembler, or the *silurus electricus* of the African rivers, displays the same property; and yet more remarkably the *gymnotus electricus*, found in the basins of stagnant water on the Llanos of South America, and in the confluents of the Orinoco. Placing his two feet upon one of the gymnoti, or electrical eels, just taken out of the water, Humboldt received a shock more violent and alarming than he ever experienced from the discharge of a large Leyden jar; and for the rest of the day he felt an acute pain in his knees, and in almost all his joints. He gives a spirited account of the manner in which the animal is taken. On the 19th of March, at an early hour, he set off with Boupland for the village of Rastro de Abaxo, whence they were conducted by the natives to a stream, which in the dry season forms a pool of muddy water, surrounded by trees. It being very difficult to catch the gymnoti with nets, on account of their extreme agility, it was resolved to procure some by intoxicating or benumbing them with the roots of certain plants, which, when thrown into the water, produce that effect. At this juncture the Indians informed them that they would fish with horses, and soon brought from the savannah about thirty of these animals, which they drove into the pool. The result may be given in the words of the traveller:—

"The extraordinary noise caused by the horses' hoofs makes the fishes issue from the mud, and excites them to combat. These yellowish and livid eels, resembling large aquatic snakes, swim at the surface of the water, and crowd under the bellies of the horses and mules. The struggle between animals of so different an organization affords a very interesting sight. The Indians, furnished with harpoons and long slender reeds, closely surround the

ne of them climb the trees, whose branches stretch horizontally ater. By their wild cries and long reeds, they prevent the horses ıg to the edge of the basin. The eels, stunned by the noise, defend by repeated discharges of their electrical batteries, and for a long likely to obtain the victory. Several horses sink under the vio- e invisible blows which they receive in the organs most essential to enumbed by the force and frequency of the shocks, disappear be- surface. Others, panting, with erect mane, and haggard eyes ex- anguish, raise themselves, and endeavor to escape from the storm rtakes them, but are driven back by the Indians. A few, however, eluding the active vigilance of the fishers: they gain the shore, every step, and stretch themselves out on the sand, exhausted with d having their limbs benumbed by the electric shocks of the gym- ess than five minutes two horses were killed. The eel, which is ng, presses itself against the belly of the horse, and makes a dis- ng the whole extent of its electric organ. It attacks at once the viscera, and the cœliac plexus of the abdominal nerves. It is nat- he effect which a horse experiences should be more powerful than ced by the same fish on a man, when he touches it only by one emities. The horses are probably not killed, but only stunned; rowned from the impossibility of rising amid the prolonged strug- en the other horses and eels." Some of the gymnoti, having ex- ir energy, were afterward secured, and were found to be from five in length, of a fine olive-green color. They are objects of dread ves, and their presence is considered to be the principal cause of e of fish in the pools of the Llanos. All the inhabitants of the id them, and it became necessary to change the direction of a road o, in consequence of the number of mules lost in fording a river hey were very numerous. It is supposed that they can communi- electric shock through a thick mass of water, and kill from a dis- prey they are anxious to devour.

ie facts gathered with reference to fishes, it appears that particu- s or basins of the ocean have tribes peculiar to them, distinct from h inhabit even contiguous seas. Thus the species common to the ulf are said to differ entirely from those of the Mediterranean, and to MM. Séron and Leseur, there is not a single animal of the south- s which is not distinguished by essential characters from the analo ies in the northern seas. The flying-fish are chiefly intertropical, farthest, they are never found beyond the fortieth parallel of lati- e the Atlantic species differ from those of the Pacific. The cod- ed throughout the whole of the northern ocean between Europe ica, chiefly haunt the great banks of sand to the southeast of New- , where they exist in undiminished numbers owing to their aston- ndity, which makes up for the havoc occasioned by the extensive Leeuwenhoek counted more than nine millions of eggs in the cod-fish of the middle size. While many species of fish appear depart from the site of their birth, but live and die in the same rs periodically migrate to a vast distance for various purposes, and ie food of nations in whose seas they are strangers and foreigners. e case with the mackerel of the north of Europe, the thunny of erranean, the pilchard, and the herring. The latter derives its ı the German *heer*, an army, in allusion to the countless swarms ılly come up from the depths of the arctic sea, and proceed to the hores of Europe, to the coasts of the United States, as well as to

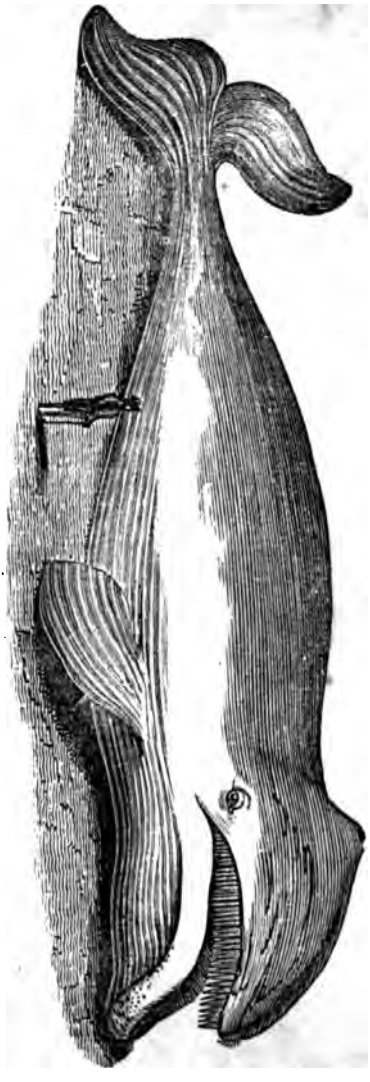


The Herring.

those of Kamschatka, and the neighboring islands. The herrings migrate to find food, and to deposite their spawn, forming shoals consisting of millions upon millions, several miles in length and width, and many fathoms in thickness. The water ripples before them as they advance. The sea-birds hover over them. A variety of splendid colors in bright weather indicates their presence at the surface of the sea, and a pale phosphoric light denotes the same in calm dark nights. This is caused by the oily substance thrown off by the fish, which is spread over their columns, and seems as if a dimly white napkin lay upon the deep. Some idea may be formed of the number of individuals in the herring shoals, from the fact mentioned by Lacepede, that the Norway fishermen capture four hundred millions in most years, and that at Gottenburgh and its vicinity seven hundred millions are annually taken; but both these sums together are insignificant when compared with the gross amount captured by the other European nations. The migrations of several kinds of fish lead them out of their element to wander over the land in quest of food, or of a more convenient habitation. Thus the common eel at night will forsake the water to traverse the meadows, feeding on the snails, it finds in its passage; and when the pools become dry in the seasons of drought, some of the Siluridan family quit their old residence in search of another, from which the water has not been evaporated. Upon the coast of Coromandel, a kind of perch, *Perca scandens*, leaves its liquid home for the shore, and even climbs up the palm-trees in pursuit of the small crustaceans upon which it feeds—an enterprise to which its organization is expressly adapted. In the West Indies and South America, the land crabs quit the mountains regularly once a year, march down to the seaside in a body of some millions at a time, directing their march with the right-lined precision of the geometer, travelling chiefly in the night, the object to be attained being the deposition of their spawn in the ocean.

It may be allowed here to notice those animals which are classed with the warm-blooded mammalia, yet whose residence is usually or exclusively marine, and whose forms are as characteristic of the fish as of the quadruped. Of these, the whale tribes, the narwal or sea-unicorn, the sea-horse, the phoca or sea-calf, and the dolphin, are the principal examples. The former gigantic animals occupy the high latitudes of the ocean, and are characteristically different in the north polar seas from their brethren in antarctic regions. Incessantly pursued by man, as affording materials that are of high value in the arts of life, the common whales have deserted their old haunts, and retired further north, under the pressure of danger, to the protection afforded by the perpetual ice. Notwithstanding their vast size, these leviathans of the deep dive with prodigious rapidity to the bottom of the soundless sea, and often in frolicsome gambols elevate the whole of their enormous mass out of the water, with the exception of the tail-fins, falling down sidewise with a noise resembling that of a distant broadside. The

Skeleton of the Whale

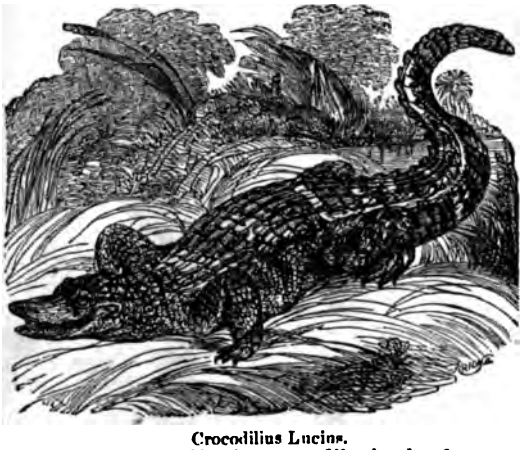


Carcass of the Whale.

seals, and other animals of the *Phocæ* tribe, are widely diffused, but those which inhabit the waters of the north differ from the members of the same family which have their station in the southern seas, and vary in their habits from those found within the tropics, the tropical species being solitary individuals, while the polar associate in herds consisting of many thousands. It has been thought a difficulty by naturalists, that inland seas, like the Caspian and Lake Aral, should have marine mammalia, the *Phocæ vitulinæ* or sea-calves, identical with those found in the Euxine and the Mediterranean; and to account for their appearance in those localities, the assistance of subterranean channels of communication between them has been conjectured. But Mr. Lyell justly remarks, that as the occurrence of wolves and other noxious animals on both sides of the British channel, was adduced as one of many arguments to prove that England and France were once united, so the correspondence of the aquatic species of the inland seas of Asia with those of the Black sea, tends to confirm the hypothesis, for which there are abundance of independent geological data, that those seas were connected together by straits at no remote period of the earth's history. To the same order of animals, the *manatus Americanus, and halicore dugong*, or sea-cow, belong; the former abounding in the Orinoco, and the latter in shallow inlets of the sea on the Malacca coast. Both species attain the length of ten or twelve feet, and are herbivorous, browsing on the fuci and algæ found at the bottom of the waters, in much the same manner as the cow does upon the grass of the field.

Among tellurian animals, the class of *reptiles* is the lowest grade. It includes quite a number of the most dangerous members of the animal kingdom, as well as the most revolting in their appearance. The tortoise, belongs to this family, occurring in abundance in tropical situations, and sometimes

The Matamata.



Crocodilus Lucius.

straying into higher latitudes, either voluntarily, attracted by a supply of food, or driven by the force of the tempest. Two instances are recorded of its appearance on the coast of Cornwall, in the year 1756, and one was taken from the Severn in 1774. In the lizard division of this class, the crocodile of the Nile, the cayman of South America, and the gavial of the Ganges, are the giants, specifically distinct, and differing also in their size and powers of destruction. The Nilotic crocodile is the largest, sometimes attaining, when

ı, the length of thirty feet. These saurians have their home in the ools and rivers, occasionally visiting the shore in search of prey, or he sunbeams; but the South American species, in calm weather, make excursions into the open sea, an important fact for the geologist to note, on account of the mingling of marine and fresh-water organic remains observable in some of the more recent deposites. The gavial of the Ganges, likewise descends below the delta of the river into the bay of Bengal, and it is not unlikely, that in such circumstances, the currents of the ocean may forbid a return, enforce migration to an opposite shore, which the animal may reach while alive, and thus contribute to the diffusion of the species.—A crocodile is still preserved at Lyons, that was taken from the Rhone about two centuries ago, having accomplished the passage of

Cabro di Capello.

ɔm the African coast. Of the genera of serpents of the poisonous kind, has the rattle-snake, Asia the hooded snake, or *cabro di capello*, and ɔ horned snake, or *cerastes*, the latter probably the asp, which the voluptuous, and disappointed Cleopatra selected as the instrument ath. These are chiefly tropical, and in general it will be found cor- as we proceed from the equator toward the poles, serpents diminish : and magnitude, as well as become comparatively innocuous. There species of snakes common in England, one of which, the viper, is ı; and it is somewhat remarkable, that none of these, nor the toad, in Ireland, for which, according to a Romish legend, that country d to the exorcising powers of St. Patrick. The largest of the ser-ɔ, the occidental boa and the oriental pythus, sometimes exceed thir length, destroying the great quadrupeds by the force with which around their bodies. A singular circumstance is recorded of the ıtion of one of these monstrous creatures alive to the island of St. which illustrates the occasional influence of the oceanic currents in ting the animal tribes. "A noble specimen," says the Rev. L. "of the boa-constrictor, was lately conveyed to us by the currents, ɔund the trunk of a large sound cedar-tree, which had probably been ut of the bank by the flood of some great South American river, huge folds hung on the branches, as it waited for its prey. The vas fortunately destroyed after killing a few sheep, and his skeleton s before me in my study, putting me in mind how much reason I ve had to fear in my future rambles through the forest of St. Vin- this formidable reptile been a pregnant female, and escaped to a ɔt." Upon several of the reptile race, the dry season near the equa-

tor has the same effect as the winter of northern latitudes, inducing a st lethargy, during which the great saurians and the serpent tribe are de the surrounding world. While the alligators of North America becom pid through excess of cold, the crocodiles of the Llanos of South Am are reduced to the same condition through a deficiency of moisture. boldt was shown a hut or shed in which a singular scene had been witn by his host of Calabazo, who, having slept in it upon a bench covered leather, was awakened early in the morning by a violent shaking, acc nied with a horrible noise. Presently a cayman issued from under the and darted at a dog lying on the threshold; but missing him, ran towar river. When the spot where the bench stood was examined, the dried was found turned up to a considerable depth, where the animal had la its state of torpidity or summer sleep. The hut being situated on the of a pool, and inundated during part of the year, the cayman had ente that period and concealed itself in the mire. The Indians often find mous boas, or water-serpents, in the same lethargic condition.

The highest department of the animal kingdom commences with the of *birds*, which may be naturally divided into the three great orders of a terrestrial, and aquatic. Aggregation into immense flocks is a distingui feature of several species, especially of the aquatic order, which form rate colonies, building their nests in the same site, though other spots

White or Bald-headed Eagle attacking the Fish-Hawk.

rently equally adapted for the purpose, are at no great distance. Hence the Vogel-bergs, or bird-rocks of the northern seas, one of which, at Westmannsharn, in the Faroo group of islands, seldom intruded upon by man, presents a most extraordinary spectacle to the visiter. The Vogel-berg lies in a frightful chasm in the precipitous shores of the island, which rise to the height of a thousand feet, only accessible from the sea by a narrow passage. Here congregate a host of birds. Thousands of guillemots and auks swim in groups around the boat which conveys man to their domain, look curiously at him, and vanish beneath the water to rise in his immediate neighborhood. The black guillemot comes close to the very oars. The seal stretches his head above the waves, not comprehending what has disturbed the repose of his asylum, while the rapacious skua pursues the puffin and gull. High in the air the birds seem like bees clustering about the rocks, while lower they fly past so close that they might be knocked down with a stick. But not less strange is the domicil of this colony. On some low rocks scarcely projecting above the water, sit the glossy cormorants, turning their long necks on every side. Next are the skua gulls, regarded with an anxious eye by the kittiwakes above. Nest follows nest in crowded rows along the whole breadth of the rock, and nothing is visible but the heads of the mothers and the white rocks between. A little higher on the narrow shelves sit the guillemots and auks, arranged as on parade, with their white breasts to the sea, and so close that a hailstone could not pass between them. The puffins take the highest station, and, though scarcely visible, betray themselves by their flying backward and forward. The noise of such a multitude of birds is confounding, and in vain a person asks a question of his nearest neighbor. The harsh tones of the kittiwake are heard above the whole, the intervals being filled with the monotonous note of the auk, and the softer voice of the guillemot. When Graba, from whose travels this description is principally drawn, visited the Vogel-berg, he was tempted by the sight of a crested cormorant to fire a gun, but what became of it, he remarks, it was impossible to ascertain. The air was darkened by the birds roused from their repose. Thousands hastened out of the chasm with a frightful noise, and spread themselves in troops over the ocean. The puffins came wandering from their holes, and regarded the confusion with comic gestures. The kittiwakes remained composedly in their nests, while the cormorants tumbled headlong into the sea. Similar great congregations of the feathered race appear where the shores are rocky, high, and precipitous, but this is strikingly the case, where

> ——"The northern ocean, in vast whirls,
> Boils round the naked melancholy isles
> Of farthest Thule; and the Atlantic surge
> Pours in among the stormy Hebrides."

Most terrestrial birds, unacquainted with man, exhibit a remarkable tameness, and are slow in acquiring a dread of him, even after repeated lessons that danger is to be apprehended from his neighborhood. Mr. Darwin speaks of a gun as almost superfluous in the unfrequented districts of South America, for with its muzzle he pushed a hawk off the branch of a tree. Once, while lying down, a mocking thrush alighted on the edge of a pitcher, made of the shell of a tortoise, which he was holding in his hand, and began very leisurely to sip the water, even allowing him to handle it while seated on the vessel. In Charles island, which had been colonized about six years, he saw a boy sitting by a well with a switch in his hand, with which he killed the doves and finches as they came to drink; and for some time he had been constantly in the habit of waiting by the well for the same purpose, to provide himself with his dinners. In the Falkland islands, at Bourbon, and at

Tristan d'Acunha, the same tameness was noticed by the early visiters. O the other hand, the small birds in the arctic regions of America, which hav never been persecuted, exhibit the anomalous fact of great wildness. Fro a review of various facts, Mr. Darwin concludes: "first, that the wildness c birds with regard to man is a particular instinct directed against *him*, and n dependent on any general degree of caution arising from other sources c danger; secondly, that it is not acquired by individual birds in a short tim even when much persecuted; but that in the course of successive generatio it becomes hereditary. Comparatively few young birds in any one year hav been injured by man in England, yet, almost all, even nestlings, are afraid c him; many individuals, however, both at the Galapagos, and at the Falkland have been pursued and injured by man, but yet have not learned a salutar dread of him."

Numerous species of birds may be regarded as the favorites of nature, o account of the gracefulness given to their shape, and the richly-colored plu mage with which they are adorned, as evidenced in the gaudy liveries o many of the parrot tribe, and the form and hues of the birds of paradis But they are especially interesting to man for the faculty of song with whic they are endowed; in some, "most musical, most melancholy," in other sprightly and animating, inspiriting the sons of toil under the burdens pecu liar to their station. It deserves to be remarked, as an instance of compen sation and adjustment, that while the birds of the temperate zone are far infe rior to those of tropical climes in point of beauty, they have far more melo dious notes in connexion with their less attractive appearance.

From the powerful means of locomotion possessed by several of the bir tribe, and their great specific levity, air being admitted to the whole organiz tion as water to a sponge, it might be inferred, that the entire atmosphere wa intended to be their domain, so that no species would be limited to a partic ular region. The common crow flies at the rate of twenty-five miles an hour the rapidity of the eider-duck, *anas mollissima*, is equal to ninety miles a hour; while the swifts and hawks travel at the astonishing speed of one hun dred and fifty miles in the same time. It is true that some species have a very extensive range, as the nightingale, the common wild goose, and severa

Canadian Goose.

Eider Duck.

of the vulture tribe. The same kind of osprey or fishing-eagle, that wanders along the Scottish shores, appears upon those of the south of Europe, and of New Holland. The lammergeyer haunts the heights of the Pyrenees, the mountains of Abyssinia, and the Mongolian steppes; and the penguin falcon occurs in Greenland, Europe, America, and Australia. In general, however, like plants and terrestrial quadrupeds, the birds are subject to geographical laws, definite limits, circumscribing particular groups. The common grouse is nowhere met with out of Great Britain; and other examples occur of a very scanty area containing a species not to be found in any other region. The celebrated birds of paradise are exclusively confined to a small part of the torrid zone, embracing New Guinea and the contiguous islands; and the beautiful lories are inhabitants of the same districts, being quite unknown in the new world. Parroquets are chiefly occupants of a zone extending a few degrees beyond each tropic, but the American group is quite distinct from the African, and neither of these have one in common with the parrots of India. The great eagle is limited to the highest summits of the Alps; and the condor, which soars above the peak of the loftiest of the Andes, never quits that chain. Humming-birds are entirely limited to the western hemi-

Humming-Birds, engaged in extracting the Nectar, and catching Insects, in Flowers.

sphere, where a particular species is sometimes bounded by the range of an island, while others are more extensively spread, the *trochilus flammifrons*, common to Lima, being observed by Captain King upon the coasts of the straits of Magellan, in the depth of winter, sucking the flowers of a large

hsia, then in bloom in the midst of a shower of snow. Among the birds apable of flight, which rival the quadrupeds in their size, the intertrop- l countries of the globe have their distinct species, presenting similar ıeral features of organization, as the ostrich of Africa and Arabia, the sowary of Java and Australia, and the touyou of Brazil. In the arctic ;ions, we meet with species peculiar to them, the *strix lapponicus* or Lap- d owl, and the eider-duck, an inhabitant of the shores, from whose nests : eider-down is obtained. Sevaral families of maritime birds are likewise iited to particular oceanic localities. Approaching the fortieth parallel latitude, the albatross is seen flitting along the surface of the waves, and ın afterward, the frigate and other tropical birds appear, which never ınder far beyond the limits of the torrid zone. It thus appears, that not- thstanding the great locomotive powers of birds, particular groups have d certain regions assigned to them as their sphere of existence, which ey are adapted to occupy, and to which they adhere in the main, though is easy to conceive of natural causes occasionally constraining to a migra- ın into new, and even distant territories. Captain Smyth informed Mr. yell, that, when engaged in his survey of the Mediterranean, he encoun- red a gale in the gulf of Lyons, at the distance of between twenty and irty leagues from the coast of France, which bore along many land-birds ' various species, some of which alighted on the ship, while others were ırown with violence against the sails. In this manner, many an islet in ıe deep, after ages of solitude and silence, uninterrupted except by the 'ave's wild dash, and the wind's fierce howl, may have received the song of irds, forced by the tempest from their home, and compelled to seek a new ne under its direction.

There is no feature more remarkable in the economy of birds than the eriodical migrations, so systematically conducted, in which five sixths of ıe whole feathered popula- on engage. In the case of lorth America, according to n estimate by Dr. Richardson, ıe passenger pigeons forming ıemselves into vast flocks for he journey, one of which as been calculated to include ,230,000,000 individuals. By utting off two claws from the eet of a certain number of wallows, Dr. Jenner ascer- ained the fact of the same ndividuals reappearing in heir old haunts in the fol- owing year, and one was met vith even after the lapse of even years. The arctic birds nigrate farther south, when he seas, lakes, and rivers, ecome covered with unbro- en sheets of ice; the swans, eese, ducks, divers, and coots,

The Swallow.

ying off in regular phalanxes to regions where a less rigorous winter allows f access to the means of life. Hence, soon after we lose the swallows, we ain the snipes and other waders, which have fled from the hard frozen

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north to our partially frozen morasses, where their ordinary nutriment may be obtained. The equinoctial zone, where the seasonal change is that of humidity and drought, furnishes an example of the same phenomenon. As soon as the Orinoco is swollen by the rains, overflows its banks, and inundates the country on either side, an innumerable quantity of aquatics leave its course for the West India islands on the north, and the valley of the Amazon on the south, the increased depths of the river, and the flooded state of the shores, depriving them of the usual supply of fish and insects. Upon the stream decreasing, and retiring within its bed, the birds return.

The class of *Quadrupeds* brings us to the most perfectly-organized members of the animal kingdom, as well as to the largest, most powerful, and ferocious; of which the lion, tiger, elephant, rhinoceros, hippopotamus, panther, leopard, hyæna, bear, and giraffe, are familiar examples. The weight of some of these animals, which may be taken as an indication of their comparative size, has been computed to be—a ton for the giraffe, three tons for the rhinoceros, three tons and a half for a hippopotamus sent to England cut up into pieces, while the elephant that was killed at Exeter Change was estimated to weigh five tons and a half. The class embraces a number of animals remarkable for their beauty, as the striped zebra and the bounding antelope, particularly the gazelle species, whose light forms, brilliant and expressive eyes, have from remote antiquity been the favorite themes of eastern song. It includes also various quadrupeds readily capable of domestication, which largely minister to the welfare of the human race, as the horse, ox, camel, and deer. In examining the distribution of the wild quadrupeds, the hot regions, extending from the equator to a few degrees beyond the tropics, are found to yield the greatest number of tribes and individuals, as well as of those animals which are distinguished by their bulk, strength, and ferocity. It has been commonly assumed, but without sufficient authority, that we have here, an excessive development of animal life, as an instance of intentional adjustment to a luxuriant vegetation. Thus Mr. Prout remarks, in his Bridgewater Treatise, that "in tropical climates, the qualities of animals, as well as those of vegetables, are developed to the utmost; and hence arises that harmonious adaptation of all the works of nature, conspicuous indeed in all climates, but in tropical climates more especially: for where else than amid the profuse exuberance of the vegetation within the tropics could the elephant, the rhinoceros, the giraffe, and other large quadrupeds, find subsistence? Where else could we expect to see such birds as the ostrich and the cassowary—such reptiles as the crocodile—such serpents as the boa?" It need only be remarked, to show the fallacy of this statement, that, upon the principle laid down, intertropical America ought to be well stocked with the animal

The Giraffe preparing to lie down.

ıe largest class, whereas it is remarkably deficient in them; while the same tribes should be rare, whereas that is precisely the ere they are most abundant.

orrectness of the opinion advanced by Mr. Prout, in common with ers, is clearly shown by Mr. Darwin, in a passage of great inter- ılue: "That large animals require a luxuriant vegetation, has been assumption, which has passed from one work to another; but I d. ıte to say that it is completely false, and that it has vitiated the s of geologists on some points of great interest in the ancient the world. The prejudice has probably been derived from India, ndian islands, where troops of elephants, noble forests, and impen- ngles, are associated together in every one's mind. If, however, to any work of travels through the southern parts of Africa, we allusions, in almost every page, either to the desert character of ry, or to the numbers of large animals inhabiting it. On the south southeastern coasts there are some fine forests; but, with these s, the traveller may pass for days together through open plains, y a poor and scanty vegetation. It is difficult to convey any accu- of degrees of comparative fertility; but it may be safely said, that nt of vegetation supported at any one time by Great Britain ex- rhaps even tenfold, the quantity on an equal area in the interior southern Africa. The fact that bullock-wagons can travel in any excepting near the coast, without more than occasionally half an lay in cutting down bushes, gives perhaps a more definite notion ntiness of the vegetation. Now if we look to the animals inhabit- wide plains, we shall find their numbers extraordinarily great, bulk immense. We must enumerate the elephant, three species eros, and probably two others, the hippopotamus, the giraffe, the (as large as a full-grown bull), and the elan (but little less), two e quaccha, two gnus, and several antelopes, even larger than these mals. It may be supposed, that although the species are numer- ndividuals of each kind are few. By the kindness of Dr. Andrew am enabled to show that the case is very different. He informs ı latitude twenty-four degrees, in one day's march with the bul- ons, he saw, without wandering to any great distance on either een one hundred and one hundred and fifty rhinoceroses, which to three species; the same day he saw several herds of giraffes, g together to nearly a hundred; and that, although no elephant rved, yet they are found in this district. At the distance of a little ı one hour's march from their place of encampment on the previ- , his party actually killed at one spot eight hippopotamuses, and r more. In the same river there were likewise crocodiles. Of was a case quite extraordinary to see so many great animals together; but it evidently proves that they must exist in great Dr. Smith describes the country passed through that day as ıly covered with grass, and bushes about four feet high, and still ly with mimosa trees. The wagons were not prevented travelling y straight line."

g can be more striking than the contrast between the South African outh American vegetation: the former meager, the latter exuberant ; yet, comparing together the weight of two of the largest species of us animals in each, the ratio of the scantily-pastured African to the tured American quadrupeds is as twenty-four to one. It is abun- dent, therefore, that there is no close relation between the bulk of

animals and the amount of vegetation in the countries which they inhabit; and that common ideas, respecting the quantity of food which a large quadruped requires for its support, are greatly exaggerated. The mention of the camel, an animal of the larger class, instantly brings the desert to our remembrance, his native region. This fact has an important bearing upon geological points; for it shows that the remains of large mammalia in the European tertiary strata, with those of the rhinoceroses discovered in the Siberian steppes, do not necessarily require the supposition that a vegetation bearing the character of tropical luxuriance was coincident with their living existence, and that a change of climate, from heat to cold, occasioned by violent catastrophes has occurred, accounting for the comparatively waste and sterile aspect of sites presumed to have been clothed with vegetable richness at a former epoch. There may have, and no doubt there has, been a great change of climate in the northern region of the globe; but it is fallacious to argue it on the ground of a tropical vegetation being required to sustain the mighty quadrupeds that once occupied the district.

A comparison between the quadrupeds of the Old and New Worlds is in every point strikingly in favor of the former. Not only has the western continent no animals of such giant bulk as those of the eastern, but no examples of such high organization, such power and courage, as the African lion and the Asiatic tiger display. Buffon's remark must indeed be considerably modified, respecting the cowardice of the American feline race; for the jaguar of the woods about the Amazon, when attacked by man, will not hesitate to accept his challenge, will even become the assailant, nor shrink from an encounter against the greatest odds. The following passages from the writings of Humboldt show that this Cisatlantic animal is not to be despised: "The night was gloomy; the Devil's Wall and its denticulated rocks appeared from time to time at a distance, illuminated by the burning of the savannahs, or wrapped in ruddy smoke. At the spot where the bushes were the thickest, our horses were frightened by the yell of an animal that seemed to follow us closely. It was a large jaguar, that had roamed for three years among these mountains. He had constantly escaped the pursuit of the boldest hunters, and had carried off horses and mules from the midst of enclosures; but, having no want of food, had *not yet* attacked men. The negro who conducted us uttered wild cries. He thought he should frighten the jaguar; but these means were of course without effect. The jaguar, like the wolf of Europe, follows travellers even when he will not attack them; the wolf in the open fields and in unsheltered places, the jaguar skirting the road, and appearing only at intervals between the bushes." The same illustrious observer also remarks: "Near the Joval, nature assumes an awful and savage aspect. We there saw the largest jaguar we had ever met with; the natives themselves were astonished at its prodigious length, which surpassed that of all the tigers of India I had seen in the collections of Europe." Still, these were extraordinary specimens of the race, and leave the fact undoubted that the most formidable of the western *feræ* has no pretensions to an equality with his congener the tyrant of the jungles of Bengal.

In vain also we look among the tribes of America for a rival in outward appearance to the giraffe, so remarkable for its height, its swan-like neck, gentle habits, and soft, expressive eye; while of the animals most serviceable to mankind—the horse, the ox, the ass, the goat, and the hog—not a living example of either was known here before its occupancy by the Europeans. But however inferior the animal races of the New may be as compared to those of the Old World, the balance between the two appears to have been pretty equal in remote ages—geological discovery has disproved the assertion

of Buffon, that the creative force in America in relation to quadrupeds never possessed great vigor, and has established the fact that it is only the more recent specimens of its energy that are upon an inferior scale. The relics of the unwieldy megatherium, of the gigantic sloth, and armadillo-like animals, discovered in great abundance imbedded in its soil, prove that at a former period it swarmed with monsters of equal bulk with those that now roam in the midst of Africa and Asia. The estuary deposite that forms the plains westward of Buenos Ayres, and covers the granitic rocks of the Banda Oriental, appears to be the grave of extinct gigantic quadrupeds.

There are various animals which are very widely dispersed, enduring the extremes of tropical heat and of polar cold, which are either in a wild condition or in a state of domestication. Wild races, considered to be varieties of the domestic dog, occur in India, Sumatra, Australia, Beloochistan, Natolia, Nubia, various parts of Africa, and both the Americas; while, in subjection to man, the dog is his faithful companion, and has followed his steps into every diversity of climate and of situation to which he has wandered. The north temperate zone of the Old Continent appears to be the native region of the ox, which passes in Lapland within the arctic circle, and has been spread over South America since its first introduction by the Spaniards. The horse—originally an inhabitant of the temperate parts of the Old World—has shared in a similar dispersion, and now exists in the high latitude of Iceland, in the desolate regions of Patagonia, and roams wild in immense herds over the Llanos of the Orinoco, leading a painful and restless life in the burning climate of the tropics. Humboldt draws a striking picture of the sufferings of these gifts of the Old World to the New, returned to a savage state in their western location:—

Esquimaux Dog.

Hare Indian Dog.

"In the rainy season, the horses that wander in the savannah, and have not time to reach the rising grounds of the Llanos, perish by hundreds amid the overflowing of the rivers. The mares are seen, followed by their colts

swimming, during a part of the day, to feed upon the grass, the tops of which alone wave above the waters. In this state they are pursued by the crocodiles; and it is by no means uncommon to find the prints of the teeth of these carnivorous reptiles on their thighs. Pressed alternately by excess of drought and of humidity, they sometimes seek a pool, in the midst of a bare and dusty soil, to quench their thirst; and at other times flee from water and the over flowing rivers, as menaced by an enemy that encounters them in every direction. Harassed during the day by gadflies and musquitoes, the horses, mules, and cows, find themselves attacked at night by enormous bats, that fasten on their backs, and cause wounds which become dangerous, because they are filled with acaridæ and other hurtful insects. In the time of great drought, the mules gnaw even the thorny melocactus (melon-thistle), in order to drink its cooling juice, and draw it forth as from a vegetable fountain. During the great inundations, these same animals lead an amphibious life, surrounded by crocodiles, water-serpents, and manatees. Yet, such are the immutable laws of Nature, their races are preserved in the struggle with the elements, and amid so many sufferings and dangers. When the waters retire, and the rivers return into their beds, the savannah is spread over with a fine odoriferous grass; and the animals of old Europe and upper Asia seem to enjoy, as in their native climate, the renewed vegetation of spring."

The first colonists of La Plata landed with seventy-two horses, in the year 1535, when, owing to a temporary desertion of the colony, the animal ran wild; and in 1580, only forty-five years afterward, it had reached the straits

Wild Asses.

of Magellan. The ass has a more restricted range than the horse, not being capable of enduring so great a degree of cold, though usually far from being considered a delicate animal. To the warmer parts of the temperate zone,

between the twentieth and fortieth parallels of latitude, the ass seems best adapted, not propagating much beyond the fiftieth, and only occurring in a state of degeneration beyond the fifty-second. The sheep and goat tribe are widely spread, equally supporting the extremes of temperature. According to Zimmerman, the *argali* or *mouflon*, the original race of sheep, still exists on all the great mountains of the two continents; and the *capricorn* and *ibex* the ancestors of the common goat, inhabit the high European elevations. From the sixty-fourth degree of north latitude, the hog is met with all over the Old Continent, and also in the islands of the Indian ocean peopled by the Malay race; and since its introduction into the New World, it has diffused itself over it, from the fiftieth parallel north as far as Patagonia. Originally the cat was not known in America, nor in any part of Oceanica; but it has now spread into almost every country of the globe. Among animals entirely wild, the most extensively diffused are, the fox, hare, squirrel, and ermine; but the species are different in every region of the world; nor is there perhaps one example to be found of a species perfectly identical naturally existing in distant localities of the earth.

Confining our attention chiefly to the wild quadrupeds, and to those of the largest class, the earth may be divided into several great zoological provinces, in each of which we find distinct groups of animals.

1. The Arctic Region. The northern parts of both continents have the same animals in common; for northeastern Asia is only separated from northwestern America by a narrow strait, across which the communication, in the winter season, is not difficult, by means of the ice and intervening islands. Throughout this district the white or polar fox is diffused, sometimes called the isatis, an animal differing from the common species, occurring in great numbers in Nova Zembla, inhabiting Kamschatka and the Aleutian isles on the one side, and Iceland and Lapland on the other. Here also is the range of the reindeer, of all large animals, the one that advances nearest to the pole. It is found on all the coasts of the Frozen ocean, and is so impatient of warmth, that in Scandinavia it can scarcely exist south of sixty-five degrees, descending in Russia to sixty-three degrees, where the climate is colder, and to fifty degrees in Asia, roving into Chinese Tartary among the Tongouses, where a still more rigorous temperature prevails. In America, the reindeer, or kariboo, which is identically the same animal, descends as low as forty-five degrees. It is indigenous in the island of Spitzbergen, and is found also in Iceland, but not as a native, having been brought there by man so late as the year 1770, when three were introduced from Norway, and turned adrift, which have since multiplied into considerable herds, not unfrequently seen in the mountainous districts. In the white or polar bear we have the monarch of quadrupeds in the arctic region—a maritime species, the *ursus maritimus* of naturalists—totally different from the common bear of the land. This ferocious and formidable animal never quits the "regions of thick-ribbed ice," nor travels far from the ocean; but haunts the shores, sometimes putting out to sea upon the drifting ice, and making distant excursions by this means, and by his own locomotive energies, being a strong and persevering swimmer. Hence he is well known in the islands, as well as the continental parts of the frozen zone, twelve or thirteen in a season occasionally finding their way from West Greenland across the strait to Iceland. It has been observed by Scoresby that they have been seen on the ice in such quantities as to be comparable to flocks of sheep on a common, and that they are often found on field-ice, above two hundred miles from the shore. Captain Parry, upon one of his voyages through Barrow's strait, met with a bear swimming in the water about midway between the shores, which were forty miles apart,

and where no ice was in sight. These facts sufficiently account for the extensive occupancy of the arctic region by the polar bear, and for his appearance on islands separated from the continents by a broad oceanic expanse. As an instance of adaptation to external circumstances, the capital clothing of the animals of this zone may be mentioned, which supplies us with the choicest furs; as well as their prevailing white color, of which we have examples in the bear, the fox, and the white hare, of Greenland—the color which reflects most heat and light.

2. North Temperate Region. This district comprises two departments, separated from each other by a wide extent of ocean, impassable to the land animals by ordinary means, the one extending through Europe and Asia, and the other through North America, between which the billows of the Atlantic and Pacific roll. Here we have two distinct zoological provinces. The common bear, which occurs in Europe and in the north of Asia, does not exist in America; nor the stag, which inhabits the European part of the Old Continent to the sixty-fourth parallel, and the Asian to the fifty-fifth. On the other hand, the corresponding tract in America is the abode of races peculiar to itself, among which we may mention the wapiti, the grizzly bear, and the bison. This latter animal once occupied nearly the whole of the temperate regions of the New World, but has retreated within narrower limits before the advancing influence of civilization. It inhabited the Carolinas at the period of the earliest colonization, and formerly extended over all the United States favorable to its existence, but it has not been seen in Kentucky since the year 1766, and now haunts chiefly the great prairies bordering on the Missouri, occasionally extending southward to the thirty-fifth, and northward to the sixty-second parallels. The bisons associate in vast herds, and, being herbivorous, are compelled to wander far, in order to find the requisite supply of vegetable food. The surface of the prairies is sometimes blackened by their numbers. "It is no exaggeration," says Mr. James, "to assert, that in one place, on the banks of the Platte, at least ten thousand burst on our sight in an instant. In the morning we again sought the living picture; but upon all the plain, which last evening was so teeming with polar animals, not one remained." Till a recent date, the Rocky mountains formed an impassable barrier to their westward progress; but of late years they are said to have discovered a passage across the range, near the sources of the Saskatchawaw, and now roam upon the banks of the Columbia. The same causes which have affected the range of these quadrupeds in North America, have operated to produce a similar effect, in various parts of the globe, in the case of other animals. The republican establishments of the beaver have vanished from the banks of the Rhone and the Danube; the bear, wild boar, and wolf, have disappeared from England; and the lion, which, in former times, must have shook the hoar-frost from his mane, as a dweller in Thrace and Macedonia, has retired entirely from Europe.

3. Region of Intertropical and South America. In this extensive tract, capable of subdivision into several distinct zoological provinces, we have, besides the jaguar—formerly mentioned—the puma, or lion of the New World, but a very feeble representative of its eastern namesake; the llama, improperly called the camel of the western continent, inhabiting Peru and Chili; the tapir of Brazil; and the didelphis, or American opossum, one of the marsupial family, which comprise those animals that produce their young in an immature state, and keep them for a time attached to their bodies, chiefly in abdominal bags or pouches, of which several genera occur in New Holland. The conformation of the American opossum differs from that of the Australian in several respects, but chiefly in having a long prehensile or mus-

cular tail, constituting a fifth limb, a furniture designed to accommodate the animal to the vast and lofty forests of Guiana, which are its abode. The monkey races are similarly furnished, and essentially differ from the apes of Africa and Asia, which have no such peculiarity. It has been remarked that America is deficient in the large and powerful animals which are found on the ancient continent; but in their place some singular tribes appear, in the formation of which the ordinary rules of nature seem to have been abandoned. Such are the tribes which Linnæus referred to his order of *bruta*, and which Cuvier has called *edentes*, quadrupeds which are partially or wholly deficient in the organs of mastication, as the sloths, the ant-eaters, and the armadilloes, the former of which especially are the defective monsters of Buffon, rude and imperfect attempts of nature. With his usual felicity, Cuvier remarks of the sloths, that "we find in them so little relation to ordinary animals; the general laws of organization prevailing among the species at present existing apply so little to them; the different parts of their bodies appear to be so much in contradiction to the laws of coexistence which we find established through almost the whole animal kingdom—that we might really suspect them to be the remains of another order of things—the living relics of that pre-existing nature, the ruins of which are elsewhere discovered only in the interior of the earth; and we might conjecture that these creatures have escaped by some miracle the catastrophes which have destroyed the other species that were their contemporaries." The organic remains of nearly-allied animals to the sloth are common in South America—the megatherium, megalonyx, scelidotherium, and mylodon—in dimensions and power the rhinoceroses and elephants of a former world.

The Camel.

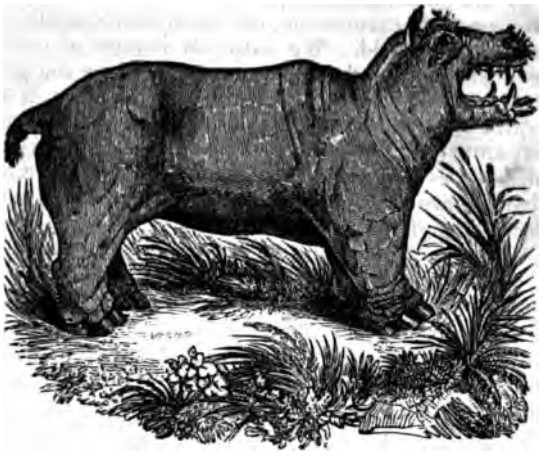
4. Region of Intertropical and South Africa. In the northern part of this district, where those desert plains commence which traverse the whole of the Old Continent, we find the one-humped camel, of which the dromedary is a fleet species, without which the Sahara could not be crossed by the caravans

In all the great rivers of this quarter of the globe, except the lower part o the Nile, the hippopotamus occurs, but more abundantly in the southern di tricts. The giraffe is peculiar to a tract of country extending from Cap Guardafui to the cape of Good Hope, probably including the mountainou plains of central Africa. Th is the location likewise of th beautiful zebra and quagg analogous animals to the hor and ass of the northern hem sphere, as well as of a variet of remarkable antelopes. N genuine tigers are found i this region; but the leopar and the panther supply the place—two species of the f line tribe that are outwardl distinguished only by the spots, those of the leopard b ing more regular and beaut fully defined, a tenant chief of Guinea and Senegambi One species of rhinoceros-

The Zebra.

that with two horns—is peculiar to South Africa, where it is very commonl met with, along with a race of elephants, distinct from the Asiatic, which a everywhere found in great numbers, from the cape of Good Hope to th twentieth parallel. While the king of quadrupeds has an extensive range i Asia, it is in Africa that the lion is most perfectly developed, exhibiting th majestic mien, that strength and courage, which have won for him his titl His home here extends from the southern roots of Mount Atlas to the Cape.

5. Region of Continental India and the Indian Archipelago. This is sp cially the country of the tiger, which, though found in eastern Persia and i China, attains his maximum size, and displays the greatest ferocity, in th jungles of Hindostan, Ceylon, and Sumatra. A variety of the elephant occ pies the continent as far as the thirtieth parallel, and occurs in some of th islands, which is the range also of the one-horned rhinoceros. But seven of the islands of the archipelago contain species and genera which are n found on the continent; and hence they are sometimes considered as formin a separate zoological province. Thus the hippopotamus, which does not e ist in any of the Asian rivers, is said to inhabit the Sunda isles; and in oth islands we have the crocodile proper, a distinct animal from the gavial of th Ganges. The tapir, also, which was once considered as peculiar to Sou America, is found in Sumatra; and the dugong, not known in any other pa of the globe, the existence of which was long treated with incredulity. Amon flying quadrupeds, or those mammifers which can imitate the flight of bird supporting themselves for a short time in the air, nearly the whole race, wi the exception of bats, are confined to the islands of southeastern Asia. Thr species of the flying lemurs occupy the Sunda, Molucca, and Pelew island and several species of the flying nocturnal squirrels inhabit Java and th neighboring parts of the archipelago. It is a conjecture of M. Lesson th the islands stretching from Asia to Australia once formed part of a gre continent, an opinion founded on the fact that these islands contain great li ing specimens of quadrupeds which are in some instances common to sever different isles, and that the channels by which they are separated are shallo and intercepted by banks apparently the remains of ground submerged. D



The Hippopotamus.

ard remarks upon this idea, that "the momentum with which the wa-
f the equatorial ocean are borne against the eastern side of America,
h it has hollowed out the gulf of Mexico, has not been sufficient to break
gh the ridge of the Cordilleras. In the eastern seas no similar mount
ain existed to support the connexion between Asia and Terra Austra-
A comparison of the geographical facts which discover themselves in
equatorial regions, goes far to confirm the opinion of M. Lesson."
Region of Australia. One of the most remarkable provinces of the ani-
ingdom, hitherto but imperfectly explored, is formed by New Holland
ie adjacent islands to the southward. We here meet with several en-
enera of quadrupeds, which, though different in many respects from
other, have some common features of organization, yet distinct from
which generally characterize the animal races in other parts of the
This great region has therefore been styled, and without any exag-
on, the cradle of a new creation, in which animal life has been arranged
a peculiar plan, apart from those laws which are its universal condi-
in other districts. The warm-blooded quadrupeds were assumed by
eus to be, without any exception, viviparous and mammiferous; the for-
erm denoting the production of their offspring in a living and perfect
and the latter term expressing the furniture of the parents with or-
for suckling their young. Such animals, therefore, on the last account,
constituted into the great class of mammalia. The Australian tribe
notremes is, however, an exception to the assumption of Linnæus, for
are warm-blooded quadrupeds that are oviparous, producing eggs from
the young are hatched, and being consequently unprovided with
niferous organs. This tribe is probably unique. Another remarkable
e of this zoological province is the prevalence of marsupial animals,
peculiar structure has been previously noticed in the instance of the
ican opossum. Besides this example of marsupiality, a few more are
chiefly in the Malay islands; but in Australia it occurs as a zoological
pplying to all the carnivorous animals, with only about the three ex-
ns of the bat, the phoca, and the dog, and distinguishing several of the
orous tribes. The wombat, the kaola, and the kangaroo, are herbivo-

rous marsupials; the phalangers are partly so, and insectivorous; the opossums and the dazyures are carnivorous, the latter corresponding to the civets and weasels of the Old World. We naturally inquire why this part of the globe should be distinguished from all other regions by the prevalence of a peculiar structure among its animal races; or, in other words, why the young of the warm-blooded quadrupeds of Australia should leave the matrix of the mother at an earlier period than those of other districts, and thus have a premature birth, so as to require an express provision for the preservation of the diminutive embryo? No reasonable conjecture can as yet be advanced upon the subject; though no doubt it stands in intimate connexion with peculiar physical circumstances, the elucidation of which may one day further develop the story of the animal kingdom.

In thus glancing at the zoology of the three great land divisions of the globe—those of America, of Europe, Asia, and Africa, and of New Holland—we perceive instances of different genera peculiar to each; and even where the same genus occurs in these far-separated localities, the climates corresponding, the species are not identical. The animals of the ape tribe; of the canine and feline races, embracing wolves, foxes, hyenas, lions, and tigers; of pachydermata, or the thick-skinned order, including elephants, tapirs, rhinoceroses, hogs; of saurians and serpents; of birds, aquatic, aerial, and terrene; and of other kinds—all are variously organized in the three great continents, as well as in different climates of the same hemisphere. If we look to the zoology of small islands, situated at no great distance from continents, like Great Britain, the Mediterranean isles, and Madagascar, we find their animal races generally the same as those on the adjoining mainlands; and with reference to those that are isolated, and far from any continent, they have commonly no land quadrupeds at all, except those that have been transported to them by man, or have found their way thither by accidental means. Some of the islets of the Keeling or Cocoo group, situated in the Indian ocean, about six hundred miles from the coast of Sumatra, are inhabited by rats, identical with the English species, which were brought in a ship from the Mauritius, wrecked upon the shores. By the European vessels, these troublesome parasites of the Old World, the rats and mice, have been conveyed to remote islets, bearing with as much impunity the heat of the equator as the cold of the north. The great groups of the Pacific, upon their first discovery, presented no warm-blooded animals, except a few tribes which had accidentally migrated or been conveyed by the natives, probably colonists from the Malayan archipelago.

The conclusion to which we are led by the preceding facts with reference to animal distribution, is clearly the theory adopted in relation to the dispersion of plants, namely, in the words of Prichard, that various tribes of organized beings were originally placed by the Creator in certain regions, to which they are by their nature peculiarly adapted, probably a single pair of each species, from which their offspring have dispersed themselves to as remote a distance from the original centre of their existence as their own powers of locomotion, their capacity to endure change of climate, and the absence of physical obstacles of migration, have enabled them to wander. In the case of birds and insects, the agency of the winds has been a potent cause of dispersion, and some well-known circumstances illustrate the mode by which animals of considerable size may be conveyed to shores distant from their original location, and become the occupants of islands to which, apparently, the ocean forbids the advance of animal life from without, unless transported thither by man. The common brown fox is found in Greenland and in Iceland, and has been borne from the former to the latter by the

e, a mode of conveyance which has been observed in operation, n mentions, that on one occasion he saw no fewer than four on , sailing away on some such voyage of discovery. The animals he ice makes no land, as is the case with immense fields which heart of the Atlantic, and melt in the warm water of the gulf- ut should it gain a shore, the living cargo may be disembarked g a new species to the district, or multiplying one previously ere in the same way. It is not uncommon for the northern voya- r the wolves fearfully howling as they die by famine, having taken in the pursuit of seals, and been set afloat, hunger overtaking e open sea. Several animals, as the rat, dog, and bear, can ac- considerable distances by their own powers of swimming; and the es of the Moray floods show, contrary to a popular sentiment, that on swine is adequate to the same performance. Three members e litter compassed the distance of five miles; and one, after being wn to the mouth of the Spey, swam nearly four miles, and landed

ell remarks, that "in an adult and wild state, these animals would have been more strong and active, and might, when hard pressed, ormed a much longer voyage. Hence islands remote from the may obtain inhabitants by casualties which, like the late storms hire, may only occur once in many centuries, or thousands of ler all the same circumstances." The isles of the Pacific have no ls, but some of those mentioned—hogs, dogs, and rats, with the of a few bats; and only rats are found in Easter island, the most seated in the Pacific.

s another method of transport, which, though very rarely in action, sively diffuse both vegetable and animal tribes. The occurrence g islands in been noticed writers. Mr. escribes some ke of Tagua- Chili, which our attention: e composed of s of various ts intertwined and on the sur- hich other liv- take root. n is generally nd their thick- four to six tly immersed ater. As the ws they pass side of the lake to the other, and often carry cattle and horses as s."

Iceland Mice floating their Food across a stream.

l the mouths of the great rivers, the Mississippi, Amazon, Orinoco, d the Ganges, similar islands are formed, where any obstacle oc- e progress of any matter drifted down by the currents from the inte- ries, and sometimes these islands are driven from their moorings or a storm, and then float away, either entire or in piecemeal, into

the open sea. They have been several times met with in the Indian o after the typhoon has raged, covered with mangrove-trees, interwoven underwood, and ships have sometimes been in peril, in consequence of taking them for firm ground. "It is highly interesting to trace, in ima tion, the effects of the passage of these rafts from the mouth of a larg er to some archipelago, such as those in the south Pacific, raised fron deep, in comparatively modern times, by the operation of the volcanc the earthquake, and the joint labors of coral animals and testacea. storm arise, and the frail vessel be wrecked, still many a bird and i may succeed in gaining by flight some island of the newly-formed g while the seeds and berries of herbs and shrubs, which fall into the w may be thrown upon the strand. But if the surface of the deep be and the rafts are carried along by a current, or wafted by some slight b of air fanning the foliage of the green trees, it may arrive, after a pa of several weeks, at the bay of an island, into which its plants and ani may be poured out as from an ark, and thus a colony of several hur new species may at once be naturalized." Extremely rare as is the o rence of such a wandering Delos, it unquestionably belongs to the cla facts, romantic as it appears; nor do the effects attributed to it at all tre beyond the sobrieties of calculation. If the West India islands had no ples of animal nor vegetable life, common to the continent of North A ica, their reception of both might be presumed, whenever the great ri the Atchalafaya (an arm of the Mississippi, ten miles long, and two hur yards broad), is broken up, as it is almost certain to be, sending down a dred islets to float in the waters of the gulf of Mexico.

SUBJECT IV.

ANIMALS.

HE animals called *mammiferous* by Linné, are all those which suckle their young, whatever be their forms or habits.

The skins of nearly all mammiferous animals are covered with hair, a slow conductor of heat, liable to little injury, and bestowed in quantity proportioned to the necessities of the animals, and the climates which they inhabit; or rather, as animals not so covered could not live in cold climates, none such are found there, and *vice versa* in regard to those not covered with hair in hot climates. Breathing creates heat, which heat is carried off by the skin, and in cold countries would be carried off too quickly but he hair or wool, which are slow conductors of heat.

he head, as the receptacle of the brain in all the higher orders, is also eat of the principal organs of sense, the mouth, the nose, the eyes, and ars. Through the mouth they receive their nourishment or soil into the y of the stomach. The teeth are used, not only for the mastication of food, but are weapons of defence. They are inverted into two moveable s called jaws. The front teeth are wedge-shaped, and their sharp edges g brought into contact divide the aliment. Next to the front teeth, on side, are the canine teeth or tusks; these are conical and pointed, and use is to tear the food. The back teeth, between which the food is icated, are called grinders. In animals which live on vegetables, these lattened at the top; but, in carnivorous animals, their surfaces are fured with sharp and conical protuberances. From the numbers, form, and osition of the teeth, the various genera of quadrupeds have been arranged innæus.

he nose is a cartilaginous body pierced with two holes called nostrils. is prominent, flat, compressed, turned upward, or bent downward. In ts of prey, it is often either longer than the lips, or of equal length with . In a few animals, it is elongated into a trunk or proboscis, and in one , the rhinoceros, is armed with one, and even, in one species, with two s. The eyes of quadrupeds, are, generally, defended by moveable eyethe outer margins of which are furnished with eyelashes. The opening e pupil is usually circular; but in some animals it is contracted into a endicular line, and in a few it forms a transverse line. The ears are ings generally accompanied by a cartilage which defends and covers , called the external ears. In wild animals the ears are erect and some funnel-shaped, capable of having their opening turned toward the quarom which the sounds proceed; but in the tame or domestic animals, the are generally long and pendulous. The head is joined to the body by eck; and those animals that often extend their arms or anterior feet for, to seize upon objects, or to fly, have, annexed to the upper part of the

breast, clavicles, or collar-bones. The collar-bones are wanting in those animals which use their foremost extremities for progressive motion only. The feet are usually divided into toes or fingers; but the extremities of some are distinguished by a single corneous substance, called a hoof. The toes of a few terminate in broad, flat nails, and of many others in pointed claws. The toes of animals that reside much in the water, are sometimes connected by a membrane.

Man, and some other animals, are capable of seizing objects, by surrounding and grasping them with their hands; for which purpose the fingers are separate, free, flexible, and long. Apes and lemurs have fingers on their hands and feet.

The bodies of all animals are supported by a frame of bones called a skeleton, to which are attached muscles for motion, assemblages of fibres held together by membranes, and terminating in a kind of cords, denominated tendons. The muscles, when excited, transfer the motion derived from reaction against the earth to the different parts of the body; and it is this action and reaction which gives to all animals the locomotive power. The sensations of animals arise from an irritation taking place on the ends of certain cords called nerves, which are either prolonged from the spinal marrow, or are united in pairs in the brain.

Quadrupeds and mammiferous animals have been divided by Linné into seven orders:—

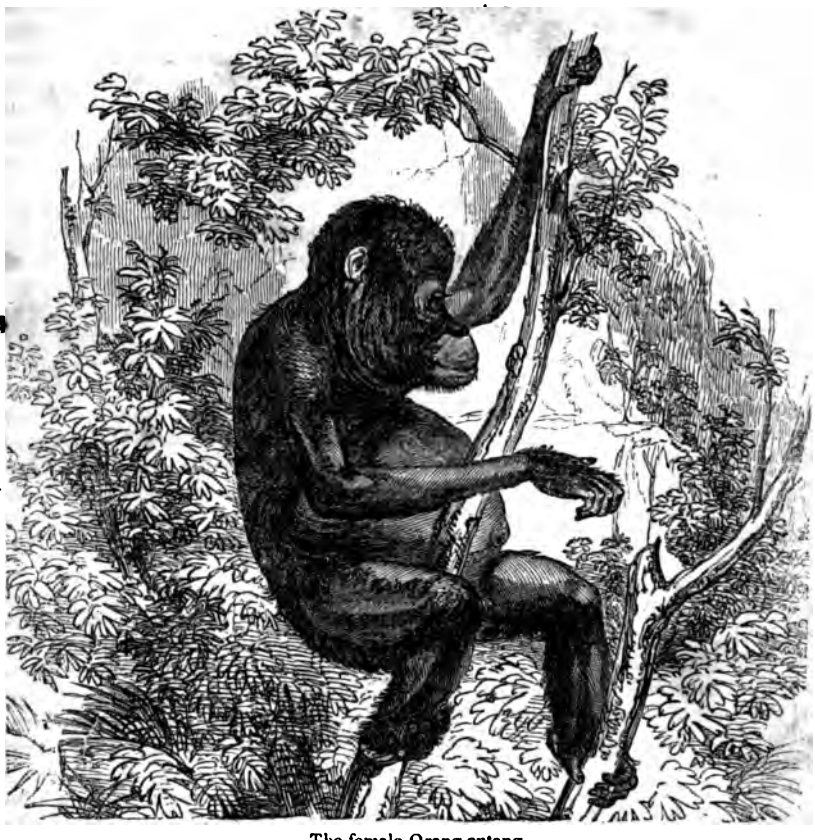
1. *Primates*, which have four front teeth in each jaw; and one canine tooth on each side in both jaws. The principal animals of this order are the apes, lemurs, and bats. 2. *Bruta*.—These are entirely destitute of front teeth. The tribes consist of the sloths, ant-eaters, rhinoceroses, elephants, and manati. 3. *Feræ*.—The feræ have generally six front teeth in each jaw; and one canine tooth on each side, in both jaws. They consist of seals, dogs, cats, weasels, otters, bears, kangaroos, moles, shrews, and urchins. 4. *Glires*.—The animals denominated glires, have two long front teeth in each jaw; and no canine teeth. They consist of the porcupines, cavies, beavers, rats, marmots, squirrels, dormice, jerboas, hares, and hyraxes. 5. *Pecora*.—The pecora are destitute of front teeth in the upper jaw, and on their feet have cloven hoofs. All the species ruminate or chew their cud. The tribes are the camels, musks, deers, giraffes, antelopes, goats, sheep, and oxen. 6. *Belluæ*.—These have obtuse front teeth in each jaw, and undivided hoofs on their feet; and consist of the horses, hippopotamuses, tapirs, and hogs. 7. *Cete or whales*.—Instead of feet, the cete, which comprise the narwal's, whale's, cachalot's, and dolphin's tribes, have fins. On the front and upper part of the skull, there are several spiracles or breathing holes. The teeth differ in the species; and the tail is flattened. We shall now proceed to speak of a few of the prominent animals in these tribes.

The Ape Tribe.—The animals of this extensive tribe are usually arranged in three divisions, of apes, baboons, and monkeys. Apes are destitute of tails: they walk upright, and their hands and feet nearly resemble those of men. They are mild and gentle, and they imitate human actions more closely and are susceptible of greater attainments, than any others of the same tribe. Baboons have short tails, and generally walk on all fours. Some baboons are as tall as men, have long faces, sunken eyes, and are extremely disgusting in their appearance, and are, for the most part, sullen and ferocious. Monkeys have tails in general longer than their bodies. They are lively, agile, full of frolic, chatter, and grimace. From the structure of their members, they have many actions in common with the human kind. Most of them are fierce and untameable; some are of a milder nature, and will show a

of attachment; but in general they are endowed with mischievous in-
, and are therefore filthy and lascivious. They inhabit the woods, and
trees, feeding on fruits, leaves, and insects. In general, they are gre-
, going in vast companies; but the different species never mix with
:her, always keeping apart and in different quarters. They leap with
tivity from tree to tree, even when loaded with their young, which
› them. They are the prey of leopards and others of the feline race,
serpents, which pursue them to the summits of trees, and swallow
ıntire. They are not carnivorous, but for the sake of mischief will
ɜ nests of birds of the eggs and young. In the countries where they
.bound, the sagacity of the feathered tribe is more marvellously shown
r contrivances to fix the nest beyond the reach of these invaders.
ıkeys generally live in extensive troops, and some naturalists have as-
that they form a sort of republic, in which a certain degree of disci-
s kept up; that they always travel in order, conducted by chiefs, who
ɜ most experienced animals of their troop. The negroes of Africa be-
hese animals to be a vagabond race of men, who are too indolent to
uct habitations or to cultivate the ground.
ı many parts of India," says Mr. Bingley, "apes and monkeys are made
s of worship by the natives, and temples of the greatest magnificence
ected in honor of them. Their numbers are almost infinite. They
ntly come in troops into the cities, and enter the houses at all times
ɔerfect freedom. In Calcutta, however, the inhabitants contrive to keep
ɔut of their dwellings; but to effect this they are compelled to have
:ir windows latticed. In Amadabad, the capital of Guzerat, there are
hospitals for animals, where sick and lame monkeys are fed and cher
'

ɜ orang-outang has sometimes obtained the appellation of the "wild
ıf the woods." A variety of essential differences has also been discov-
n the internal conformation of this animal: which sufficiently evince,
ıotwithstanding the apparent affinity to man, the interval which sepa-
the two species is immense; the resemblance in figure and organization,
ıe imitative movements which seem to result from these similarities,
:r make him approach the nature of man, nor elevate him above that
› brute.
ıas a flat face, and a deformed resemblance of the human; ears like
of a man; the hair on the head longer than on the body. The body
.mbs are covered with reddish and shaggy hair; longest on the back—
est on the fore parts. The face and paws are swarthy; the buttocks cov-
with hair. They inhabit the interior parts of Africa, the isles of Su-
ı, Borneo, and Java; are solitary, and live in the most desert places.
grow to the height of six feet, have prodigious strength, and will over-
r the strongest man. The old ones are shot with arrows, the young
can be taken alive. They will attack and kill the negroes who wan-
ı the woods, and will throw stones at people that offend them. They
in trees, and make a sort of shelter from the inclemency of the weath-
They are of a grave appearance and melancholy disposition, and even
young not inclined to frolic. They go erect, and are very swift.
e orang-outangs on the banks of the Ganges are larger and more mis-
ous than in any part of Africa; the negroes dread them, and can not
l alone in the country without running the hazard of being attacked by
animals, who often present them with a stick, and force them to fight.
of the negroes imagine they are a foreign nation come to inhabit their
ry, who do not speak, for fear of being compelled to work. When

taken young, they are capable of being tamed, and taught to perform many menial offices. In Sierra Leone is a species so strong-limbed and so industrious, that, when properly trained and fed, they work like servants; these



The female Orang-outang.

generally walk on the two hind feet; pound any substances in a mortar; go to bring water from the river in small pitchers, which they carry full on their heads. But when they arrive at the door, if the pitchers are not soon taken off, they allow them to fall; and when they perceive the pitchers overturned and broken, they weep bitterly. They are taken with snares, taught to walk on their hind feet, and to use their fore feet as hands in performing different operations, as rinsing glasses, carrying drink round to the company, turning a spit, &c.

Gaut saw at Java a very extraordinary ape, a female, whose figure had a very great resemblance to that of man. She was very tall, and often walked erect. Except the eyebrows, there was no hair on her face, which much resembled the grotesque female faces of the Hottentots at the Cape She made her bed neatly every day, lay upon her side, and covered herself with the bedclothes. When her head ached, she bound it up with a handkerchief, and it was amusing to see her thus hooded in her bed; many other

:tions appeared extremely singular: but the design of bringing her to Eu-
ope being for exhibition as a show, probably she had been taught many of
iese monkey-tricks, which other people considered as natural to the animal.
he died on board ship, about the latitude of the cape of Good Hope.

Carreri saw one which cried like an infant, walked upright on its hind
et, and carried a mat under its arms to lie down and sleep upon. Buffon saw
1 orang-outang that was mild, affectionate, and good-natured. His air was
elancholy, gait grave, movements measured, dispositions gentle, and very
fferent from those of other apes. He had neither the impatience of the
arbary ape, the maliciousness of the baboon, nor the extravagance of the
onkeys. It may be alleged that he had the benefit of instruction; but the
her apes were educated similarly. Signs and words were alone sufficient
make him act, but the baboon required a cudgel, and the other apes a
hip; for not one of them would obey without blows. This animal would
esent his hand to conduct his visiters, and walk as gravely along with them
if he had formed a part of the company. He would sit down at table,
ifold his towel, wipe his lips, use a spoon or a fork to carry the victuals to
s mouth, pour his liquor into a glass, and make it touch that of the person
ho drank along with him. When invited to take tea, he brought a cup and
saucer, placed them on the table, put in sugar, poured out tea, and allowed
to cool before he drank it. All these actions he performed without any
her instigation than the signs or verbal orders of his master, and often of
s own accord. He did no injury to any person: he even approached com-
any with circumspection, and presented himself as if he wanted to be ca-
essed. He lived one summer at Paris, and died in London the following
inter.

M. de la Brosse, a French navigator, who was in Angola in the year 1718,
nd who purchased from a negro two orang-outangs, remarks that these ani-
ials would sit at table like men, and eat there every kind of food without
istinction; that they would use a knife, a fork, or spoon, to cut or lay hold
f what was put on their plate; and that they drank wine and other liquors.
it table, when they wanted anything, they easily made themselves understood
o the cabin-boy; and when the boy refused to answer their demands, they
ometimes became enraged, caught him by the arm, bit, and threw him down.
he male was seized with sickness, and he made the people attend him as if
e had been a human being. He was even bled twice in the right arm, and,
henever afterward he found himself in the same condition, he held out his
rm to be bled, as if he knew that he had formerly received benefit from the
peration.

Buffon describes a female orang-outang from the island of Borneo, which
vas brought alive into Holland, in 1776, and lodged in the menagerie of the
rince of Orange. She was extremely gentle, and exhibited no symptoms
hatever of fierceness or malignity. She had a somewhat melancholy appear-
nce, yet loved to be in company, and particularly with those persons to
hose care she was intrusted.

One morning she escaped from her chain, and soon afterward was seen as-
ending the beams and oblique rafters of the building with wonderful agility.
Vith some trouble she was retaken; but the efforts of four men were found
ecessary to secure her. Two of these seized her by the legs, and a third by
ie head, while the other fastened the cord round her body. During the time
ie was at liberty she had taken the cork from a bottle of Malaga wine, drank
e wine to the last drop, and then set the bottle again in its place. She would
t of almost every kind of food that was given to her; but she lived chiefly
1 bread, roots, and fruit. Carrots and strawberries she was peculiarly fond

of, as well as of several kinds of aromatic plants, and of the leaves and root of parsley. She also ate meat, both boiled and roasted, as well as fish; and was fond of eggs, the shells of which she broke with her teeth, and then emptied, by sucking out the contents. When strawberries were given to her on a plate, it was amusing to see her take them up, one by one, with a fork, and put them into her mouth, holding at the same time the plate in her other hand. Her usual drink was water, but she would also eagerly drink all sorts of wine, particularly Malaga. After drinking, she wiped her lips; and after eating, if presented with a toothpick, she would use it in a proper manner. One day, seeing the padlock of her chain opened with a key, and shut again, she seized a little bit of stick, and put it into the key-hole, turning it about in all directions, and examining to ascertain whether the padlock would not open.

In 1817, a young orang-outang was brought to England, in one of the ships attached to the expedition which had sailed with Lord Amherst to China. It then measured only about two feet seven inches in length, from his heel to the crown of his head. When brought to London, in the month of August, 1817, this animal was deposited, for exhibition, in the menagerie at Exeter 'Change. He was there found to be extremely tame and gentle, and frequently took food and sat by the fire, in the keeper's apartment. He increased astonishingly in all his dimensions. He died on the 1st of April, 1819. The immediate cause of his death was the changing of his teeth, from which it was ascertained that he must have been extremely young when first caught. His skin and skeleton were deposited in the museum of the College of Surgeons in London.

One of the most interesting orang-outangs observed by naturalists is that of the Zoological Society, as represented in our cut. A writer remarks in regard to it—"Though this animal is naturally and habitually dull and inanimate, it has its times of sportiveness, when it readily engages in play with those to whom it is attached, follows them to court their notice, or pursues them in mimic combat. Perhaps, indeed, there is a latent disposition in it to attack those whom it deems itself capable of overcoming. A young gentleman in our presence pretended to be afraid, and retreated gradually before it, whereon it perseveringly followed him for a considerable period; we tried the same experiment ourselves, and it gave chase to us completely round the apartment: but when it found its efforts vain, it waddled to its keeper, whom it evidently regarded as its protector, and to whom it manifested the utmost attachment. The next moment it suffered us to approach it, and take it by the hand, without the least sign of displeasure. One of its favorite attitudes is to sit 'à la Turque,' in a low chair, or on the floor before the fire, with a blanket wrapped comfortably around it, and which it arranges without assistance, drawing it over the shoulders and around the body. Thus at ease, it will remain, if its keeper be near, without any change, regardless of all that passes around; for, unlike the lively, inquisitive chimpanzee (formerly in the same collection), which was interested in all about it, and fond of seizing everything with childlike eagerness, it seems to take but little interest in the novelties on every side. The sight of the giraffes, on its first introduction to them, excited neither surprise nor fear. It has, however, tried occasionally to lay hold of a giraffe's nose, as it bends its long neck over the rails of the enclosure, and lowers its head toward the orang, attracted by the food in its hand. While we were present it took not the slightest notice of them, though from time to time their necks were arched above it. Like its predecessor, the chimpanzee, it recognises its name, and obeys the command of its keeper; and we several times saw it wrap itself up in the blanket at his bidding, and

The Orang-Outang of the Zoological Society, London.

seat itself in its chair. If, however, he moved to a distance, it immediately followed. The only instance of curiosity which it manifested in our presence was to examine the pockets of its keeper, in search of bread or some article of diet; but it seemed to be incited by no spirit of inquisitiveness. A bystander put a cane or slender walking-stick into its hand: it held the stick listlessly, gently applied its teeth as if to try its texture, and easily relinquished it, neither playing with it nor appearing disposed to retain it. Fond as it is of its keeper, it receives his attentions with less apparent pleasure than the chimpanzee did under similar circumstances. On purpose to incite it to a game of romps while we stayed to watch it, he played with it as with a child, and tickled it in various places about the sides and chest, rousing it into momentary mirth: its face at that time assumed the expression of laughter; it grinned with evident pleasure, its eyes twinkled, and it uttered a half-suppressed, feeble sort of noise, with less, however, of the 'chuckle' in it—less decidedly laughter-like—than were the tones uttered by the chimpanzee under similar treatment; and when its keeper ceased, it did not invite him to a renewal of the play, but settled into its habitual state of seeming apathy.

"Confinement, which is irksome to all animals, is evidently distressing to this little orang: it can not bear to be separated by intervening bars from its keeper; and on some recent attempts to confine it for a short time to its bamboo-latticed enclosure, there being wire between each bamooo, to narrow the interstices—straining apart the latter with its arms, it readily forced itself through, so that cross-wires have been intertwined with the former, for the sake of preventing a repetition. It is, however, very questionable whether, if perseveringly confined for several hours together every day, it will not pine, to the injury of its health, so much does it dislike to be left alone.

"Dressed in its Guernsey jacket and trousers, a sort of clothing which it needs in the English climate, its appearance, seated on its chair, or at the table with its keeper in his private room, is very amusing; nor less so the expression of its countenance, when soliciting a share of the food before it: it looks at its keeper, looks at the tempting morsel, and protrudes its flexible lips into the form of a conical proboscis; when offered any liquid to drink in a cup or saucer, it does not however dip its lips into the fluid, but holding the cup in its hand, puts the rim between its lips and so drains up the contents, exactly as a child would do under similar circumstances, and with all due gravity and decorum. Disappointment is trying to all, and this little orang is not an exception to the general rule: it does not endure it with unruffled feelings. Mr. G. Bennett, speaking of an orang which he had the opportunity of seeing in the possession of Mr. Davies at Java, observes that when a large bamboo cage was constructed, and in which it was attempted to confine him, 'he screamed with rage on being placed in it, and exerting his muscular power, soon demolished it, and was then quiet as before.' The same gentleman also notices the rage produced by disappointment in a species of gibbon which he was endeavoring to bring home, and which, as he says, 'when refused or disappointed at anything, would display the freaks of temper of a spoiled child, lie on the deck, and dash everything aside that might be within his reach; walk hurriedly, and repeat the same scene over and over again.' It is much in the same manner that this little orang displays its passion, throwing itself about on the floor, and uttering its whining cry till satisfied, and satisfied it must be before it will resume its ordinary composure. The person who brought it to England intimated that it had exhibited several violent paroxysms of passion while on board; and occasionally since its introduction into the Zoological Gardens it has indulged

fits of anger: but as kind treatment is the uniform course pursued toward occasions of such an outburst but rarely occur; unless, indeed, when it confined in its enclosure, and necessarily separated from the person in ırge of it. One of these scenes took place very recently: its keeper hav- fastened the door of its bamboo-latticed enclosure and gone about his er duties, it gave way at once to a paroxysm of violent passion; it trav- ed the bamboo framework with the utmost celerity, for it was roused to ısual activity, striving to force the rods apart, and escape into the room; eaming with disappointment, it swung itself to the branches of the trees ›wing in the enclosure, and descending thence to the floor, it dragged its ır (a heavy chair, too) to the door, and using it as a sort of battering-ram, leavored by violent and repeated blows to force open the unyielding wick- : disappointed in its efforts, it again swung itself from branch to branch, eaming with rage, again traversed the lattice-work, and again tried at the ɔr with its chair. Nothing but the return of its keeper pacified it. A me of this nature serves to prove the correctness of the reports of the na- es of Borneo respecting the adult orang, which is much dreaded there. ıey say that he will sit in listless apathy for hours among the topmost anches of the forest, in solitary seclusion; and that unless when roused, his ›vements are slow and indolent, but that when attacked, he performs the ›st astonishing feats among the branches, and defends himself with deter- ned resolution. His bodily powers, as the enormous bulk of the chest de- ıres, are prodigious, and his long sinewy arms enable him, while swinging the feet from a branch overhead, to grapple with his antagonist. Unless ovoked, however, he makes no attack, but is quiet and peaceful.

"The disgust or fear entertained by the orang (at least while young) tow- u tortoises is well known; and the young chimpanzee, before alluded to, coiled with horror from a large snake introduced into the room by way of :periment, and tortoises also were regarded with aversion. The present ang has not (and we think wisely) been made the subject of a snake exper- ıent; it has, however, been tried with a small tortoise, at the sight of which, the animal crawled along, it stood aghast, in an attitude of amazement lu- crously theatrical; nothing could induce it to pass the crawling object of its strust. It would appear, however, that familiarity with the sight of tortoises sily removed the apprehensions of the orang, for after this had seen a tor- ise a few times, it exhibited less annoyance at the creature's presence. 'hatever instinctive fear the orang or chimpanzee may entertain toward the rger snakes, or indeed snakes of any size, some of which are to be dreaded r their poison, it can not, we think, be imputed to such an instinct that the ang is amazed or alarmed at the presence of a tortoise, inasmuch as the rtoise is utterly incapable of inflicting the slightest injury; we must there- re attribute the amazement of the young orang rather to the strange appear- ce of the animal—an animal so unlike every living thing which it had hith- to witnessed, an animal of suspicious aspect, and the qualities of which it d yet to prove—than to any innate fear implanted as a preservative.

"The young orang of the Zoological Gardens, we need not say, is not the st of its race which, within the last few years, has been brought to Eng- ıd; but it is certainly the first which so fairly promises to reward, by a long ıidence in its new domicil, the care manifested toward it, and the exertions maintain it in health and comfort. It is not many years since that the ıracter, habits, and form of the orang, were among the desiderata of sci- ›e. Ignorance and credulity had invested it with faculties and intellects ›dering upon those peculiar to the human race; it was accounted but little ›er than man. The earlier travellers and voyagers had filled their pages

with descriptions teeming with the marvellous; and men of learning had indulged in the wildest speculations respecting its capabilities of progressive refinement, and its affinity to our race. These puerile fancies have all dissipated before true science; and we now know that extraordinary as the orang may be, compared with its fellows of the brute creation, still in nothing does it trench upon the moral or mental provinces of man."

The baboon differs from animals of the ape-kind, not only in external appearance, but also in temper and disposition: fierce, untractable, and libidinous, its disposition seems to partake of the hideous and disgusting deformities of its outward figure. Its body is thick, compact, and nervous, and its strength prodigious. Neither art nor caresses can render it in any degree docile or obedient. It seems to be continually fretting with rage, and seeking every opportunity of showing its savage and vicious propensities. In a state of captivity, it must be kept closely confined; and even in that state, it sometimes shakes the bars of its cage so powerfully with its hands as to excite the utmost terror in the spectator.

The Ursine Baboon.

This animal is from three to four feet high, very strong built, with a thick body and limbs, and large callosities behind, which are quite naked and red. Its tail is crooked, and about seven or eight inches long. Its snout is long and thick; and on each cheek is a pouch, for receiving its superfluous provision. It is covered with long thick hair, of a reddish-brown color, and walks more commonly on all-fours than erect. Its hands, as well as its feet, are armed with long sharp claws.

The baboon inhabits the hottest parts of Africa, and feeds on fruits, roots, and other vegetables; and sometimes they assemble in troops and plunder gardens and cultivated grounds. They are extremely dexterous in throwing the fruit from one to another, and by this means do incredible damage in a short time.

In Siam they frequently sally forth in troops to attack the villages during the rice-harvest, and they plunder the houses of whatever provisions they can lay their paws on. Fruit, corn, and roots, form their principal food, and in obtaining these they often commit the most violent outrages. The capricious disposition of this baboon often leads it to the most deliberate acts of mischief. Dr. Goldsmith says he has seen one of these animals break a whole service of china, evidently by design, yet without appearing to be in the least conscious of having done amiss.

Bats.—According to the classification of Cuvier, bats constitute a family called *Vespertiliones*, of the sub-division *Cheiroptera*, in the order of *Carnassiers*. The characteristics of the entire subdivision may be thus enumerated: The fingers are connected by a membrane, which spreads from the

ɪr to the posterior extremities, fitting the animals for flight. Incisor ariable in number; canine teeth more or less strong; grinders, in l having acute-pointed crowns, with a longitudinal furrow; collar- very strong; large shoulder-blades; fore-arms not capable of rota- otion; and the breast furnished with two paps. This character of ɔ-division will render intelligible the more detailed description of the ɪily, which may be thus characterized: The toes or fingers of the nbs are much larger than those of the hinder, united by broad ry fine membranes, usually t claws; the thumb alone is ɛed but is not opposable to er fingers, and is very short ɪortion to them; it is long- the genus *Pteropus*, and is furnished with a strong and ɪarp claw. The toes of the feet are united, short, and ɜd with very strong nails. ɪtting teeth are sometimes g in one of the jaws, or vith the genus, from two ; the canine teeth are for ɔst part very strong; and inders have generally sharp erances. These keen and pointed teeth enable them to bite with much and those of a considerable age and size can inflict a very severe . The wing-like membrane is naked. Some species possess only liments of a tail, while in others the tail is of considerable length ɪrs are almost always large in proportion to the size of the animal.

The Common Bat.

bat tribe comprehends : number of genera, spe- ɪd varieties, among which ɪnd some very singular ɛations of structure, in rm of the wing mem- , the figure and expan- f the ears, and the re- ble membraneous appen- to the noses of several ɪ. The species vary ' in size, from that of allest common mouse to f the enormous bat of which we shall presently ɔe. The smaller species ɪndantly distributed over ɛe of the globe; but the appear to be confined to gions, where they exist ɪt numbers. Some spe- ɛem to live exclusively on insects, while others eat fruit as well ects; and it is known that bats have seldom much objection tc e of any raw or dressed meat, whether fresh or tainted, which ɪs to be within their reach. The purely insectivorous species render

The Noctilio.

great service to mankind, by the destruction of vast numbers of i which they pursue with great eagerness from the evening to the ing twilight;* but in those countries where they are abundant, the fi rous species commit fearful havoc among the fruits on the trees. B: said to drink on the wing by sipping the surface like swallows as th over pools and streams. They are fond of frequenting waters, not o the sake of drinking, but on account of the insects which abound i places. All the different species of bats are nocturnal animals; th ceal themselves during the daytime in old buildings, in barns, in trees, in caverns, vaults, and similar retreats, where they cling toge large clusters, so that they seem to form but one mass.

In the east, inhabited houses are not free from their intrusions have seen great numbers of them clinging to the arches of the cool cellars which are inhabited during the summer at Bagdad; and not only so, but to the vaulted ceilings of light and lofty rooms on the first floor. We have thus had them continually in the same rooms with us. We never observed a single bat leave its position, or even change it, during the day; though from the shapeless and furry mass of heads peered out with sufficient frequency to indicate that, in the summer days, it was not merely sleep that kept them motionless. Noise never seemed to disturb them; and if actually touche would fly off, indeed, but would immediately return and form their again on the same spot.

The Pigmy Vespertilio.

The natural posture of repose to the animal is that of suspending itself by the hind claws, with the head downward. In this posture the wings serve as a sort of cloak or mantle; and in this they also sometimes cover up their young, although they will fly about at other times with two young ones at the breast in the act of sucking. These young ones together fre exceed the weight of the parent; and the tenacity with which the their hold is amazing.

The Long-eared Bat.

The eyes of bats are deeply seated in their heads, and are very s many of the species. It does not, indeed, appear that they are essential use in directing their course, for it is one of the most extrao facts in natural history, that privation of sight does not prevent the

* Some accounts seem to say that bats are only abroad in the morning and evening twili we have seen them flitting about in full activity at all hours of the night.

The Kalong Bat.

moving in the air, and from avoiding obstacles, to all appearance as readily as when they possessed the power of seeing. It has been thought that the wings, by their delicate structure, serve as feelers to the animal in guiding its flight in the dark. Spallanzani, the distinguished naturalist, hung some cloths across a large room, with holes in them here and there large enough for a bat to fly through. He had previously prepared some for this experiment by the cruel process of depriving them of their sight, and, as much as possible, of their hearing. On being turned loose, they flew without the least difficulty through the holes in the cloth, without touching the cloth itself.

It seems to be very difficult for bats to raise themselves into the air from a flat or level surface, and this may be one cause for the suspended posture in which they are usually found. They do, however, sometimes settle on the ground, probably to seek food that can not be obtained on the wing. When they do so, they shut their wings, and are able to walk, or even to run at a good pace, though with considerable awkwardness.

The Kalong bat, *Pteropus Javanicus*, which is represented in our engraving, is the largest species of the genus that has hitherto been discovered. In adult subjects, the breadth of the expanded wings is full five feet, and the length of the body one foot. In the Museum of the East India company there are several specimens, in the largest of which the expansion of the wings is five feet two inches, and, in the smallest, three feet ten inches; all the other specimens measure nearly five feet. The length of the arm and fore-arm together, from the union with the body to the origin of the finger-joints, is fourteen inches. The naked thumb, projecting beyond the membrane, measures two inches; and the claw, which is strong and sharp, has an extent of nearly one inch along its curvature. On the fore-finger the claw is minute, and, by the particular inflection of the joints, it obtains a direction opposed to the plane of the membrane. The length of the hind legs is eight inches and a half.

The head, as in other species of *Pteropus*, is oblong, and the muzzle comparatively of moderate length; it is very gradually attenuated, and measures less than one third of the entire length of the head. The nose is short, and somewhat compressed at the sides. The nostrils are round anteriorly, and pass backward by a curve, resembling part of a volute. The ears are simple, long, narrow, and pointed. The eyes are large and prominent, and the irides dark. The gape of the mouth terminates under the anterior corner of the eye. The nose projects but slightly beyond the jaw, and the lips are narrow, and form a neatly-defined enclosure of the mouth.

The color of the flying membrane is dark-brown, inclining to black, with a slight yellowish-red tint. The general color of the body and head is black, and of the neck and adjoining parts above smoky-brown; but both the extent and intensity of the colors are subject to variations. The upper and lateral parts of the neck, and the adjoining parts of the back, between the shoulders, afford a principal distinction in the varieties of this species. In many individuals the brown or yellowish-red hairs form a complete collar round the neck, though the color is always more intense above. The breadth of this collar varies considerably; in some cases it extends from the middle of the head to beyond the shoulders—in others it is confined to the neck, and the back part of the head. The tint likewise varies from yellowish-red to blackish-brown, but in all cases it has a smoky hue. In young subjects the hairs are long, soft to the touch, and glossy; in old subjects they become crisp and rough.

The *Pteropus Javanicus* is extremely abundant in the lower parts of Java,

and uniformly lives in society. The more elevated districts are not visited by it. Numerous individuals select a large tree for their resort, and suspending themselves with the claws of their posterior extremities to the naked branches, often in companies of several hundreds, afford to a stranger a very singular spectacle. A species of *Ficus*, in habit resembling the *Ficus religiosa* of India, which is often found near the villages of the natives, affords them a very favorite retreat, and the extended branches of one of these are sometimes covered by them. In general, these societies preserve a perfect silence during the day; but if they are disturbed, or if a contention arises among them, they emit sharp piercing shrieks, and their awkward attempts to extricate themselves, when oppressed by the light of the sun, exhibit a ludicrous spectacle. In consequence of the sharpness of their claws, their attachment is so strong that they can not readily leave their hold without the assistance of the expanded membrane; and if suddenly killed in this natural attitude during the day, they continue suspended after death. It is necessary, therefore, to oblige them to take wing by alarming them, if it be desired to obtain them during the day. Soon after sunset they gradually quit their hold, and pursue their nocturnal flights in quest of food. They direct their course by an unerring instinct, to the forests, villages, and plantations, occasioning incalculable mischief—attacking and devouring indiscriminately every kind of fruit, from the abundant and useful cacaonut, which surrounds every dwelling of the meanest peasantry, to the rare and most delicate productions which are cultivated with care by princes and chiefs of distinction.

There are few situations in the lower parts of Java in which this night-wanderer is not constantly observed. As soon as the light of the sun has retired, one animal is seen to follow another, at a short but irregular distance, and this succession continues uninterrupted till darkness obstructs the view. The flight of the Kalong is slow and steady, pursued in a straight line, and capable of long continuance. The chase of it forms occasionally an amusement to the colonists and inhabitants during the moonlight nights, which, in the latitude of Java, are uncommonly serene. He is watched in his descent to the fruit-trees, and a discharge of small shot readily brings him to the ground.

The Sloth.—The appearance of this animal is so helpless as to excite compassion. It has three claws upon each foot, and a short tail. Its fur is long and coarse, resembling dried grass; the mouth extremely wide; the eyes dull and heavy; and the legs and feet set on so awkwardly, that a few paces often require the effort of a week. The legs, indeed, proceed from the body in such an oblique direction, that the sole of the foot seldom touches the ground. When, therefore, the animal is compelled to make a step forward, it scrapes on the back of the nails against the surface, and wheeling the limb circularly about, yet still touching the ground, it at length places its foot in a progressive position; the other three limbs are brought about with the same difficulty, and thus it seldom moves above three feet in an hour. In fact, it seldom attempts to change its place but by constraint, or when impelled by the severest stings of hunger. It is about the size of a cat, very ugly, and has claws extended like fingers.

The sloth subsists entirely upon vegetable food, and, as it requires a considerable share of provision, it generally strips a tree of all its verdure in less than a fortnight. It then falls to devouring the bark, and thus in a short time destroys the very source of its support. When this is the case, being unable to descend, it is obliged to drop from the branches to the ground; and, after remaining sometime torpid, from the violence of its fall, it pre-

The Sloth.

pares for a tedious, dangerous, and painful migration to some neighboring tree, which it ascends by two days' exertion, and soon kills it like the former. Its power of abstinence is very remarkable, and the strength of its feet so great, that whatever it seizes on can not possibly be freed from its claws.

Sloths suspend themselves by their claws from the branches of trees, and, thus hanging, a branch may be cut off, and they will fall with it rather than quit their hold. A sloth that was taken on board a ship, and put down at the foot of the mizen shrouds, climbed to the mast-head, but occupied two hours in what a monkey would have performed in half a minute. It proceeded very slowly and deliberately, as if all its movements had been directed by machinery.

When kept in a house the sloth never rests on the ground, but always climbs upon some post or door to repose. If a pole be held out to one of these animals when on the ground, it will immediately lay hold of it; and, if this be afterward fixed upright, will climb to the top, and there adhere.

The DOUBLE-HORNED RHINOCEROS differs from the common rhinoceros in the appearance of its skin, which, instead of large and regularly-marked folds, resembling armor, has merely a slight wrinkle across the shoulders and on the hinder parts, with a few fainter wrinkles on the sides; so that, when compared with the common rhinoceros, it appears almost smooth. The prin

cipal distinction, however, consists in the nose being furnished with two horn one of which is smaller than the other, and situated above it.

Bruce informs us, that besides the trees that are capable of most resis ance, there are, in the vast forests within the rains, trees of a softer consis ence, and of succulent quality, which seemed to be destined for the princ pal food of the double-horned rhinoceros. For the purpose of gaining th highest branches of these, his upper lip is capable of being lengthened o so as to increase his power of laying hold with it, in the same manner as th elephant does with his trunk. With this lip, and the assistance of his tongu he pulls down the upper branches, which have most leaves, and these l devours first. Having stripped the tree of its branches, he does not imm diately abandon it; but, placing his snout as low in the trunk as he finds h horn will enter, he rips up the body of the tree, and reduces it to thin piec like so many laths; and, when he has thus prepared it, he embraces as mu of it as possible in his monstrous jaws, and twists it round with as much ea as an ox would do a root of celery, or any small plant.

When pursued, and in fear, he moves with astonishing swiftness, consi ering his size, the apparent unwieldiness of his body, his great weight befo and the shortness of his legs. It is not, however, true, that in a plain h pace is more rapid than that of a horse, for Mr. Bruce has often passed the animals with ease, and seen other persons, worse mounted than himself, the same; but by his cunning he is often able to elude pursuit. He mak constantly from wood to wood, and forces himself into the thickest parts the forests. The trees that are dead or dry, are broken down, as if with cannon-shot, and fall behind and on each side of him, in all directions. Ot ers that are more pliable, greener, or fuller of sap, are bent back by h weight, and by the velocity of his motions. And, after he has passed, th restore themselves, like a green branch, to their natural position, and oft sweep the incautious pursuer and his horse from the ground, and dash the in pieces against the surrounding trees.

"We were on horseback," says Mr. Bruce, "by dawn of day, in search the rhinoceros, many of which we had heard making a very deep groan a cry as the morning approached. Several of the agageers, or hunters, th joined us, and after we had searched about an hour in the very thickest p of the wood, a rhinoceros rushed out with great violence, and crossed t plain toward a wood of canes that was about two miles distant. But thou he ran, or rather trotted, with surprising speed, considering his bulk, he w in a short time, transfixed with thirty or forty javelins. This attack so co founded him, that he left his purpose of going to the wood, and ran into deep hole, or ravine, without outlet, breaking above a dozen of the javeli as he entered. Here we thought he was caught as in a trap, for he h scarcely room to turn; and a servant, who had a gun, standing directly ov him, fired at his head, and the animal fell immediately, to all appearan dead. All those on foot now jumped in with their knives to cut him up, b they had scarcely begun, when the animal recovered so far as to rise upon h knees: happy then was the man that escaped first, and had not one of th agageers, who was himself engaged in the ravine, cut the sinews of th hind legs as he was retreating, there would have been a very sorrowful accou of the foot-hunters that day."

The Wolf.—This animal from the tip of the nose to the insertion of th tail, is about three feet and a half long, and about two feet five inches hig His color is a mixture of black, brown, and gray; and his hair extrem rough and hard, but mixed toward the roots with a kind of ash-colored fu The eyes open slantingly upward, in the same direction with the nose, a

The Dusky Wolf.

e color of the eye-balls is of a fiery green, giving a fierce and formidable r to the whole visage.

The wolf is one of those quadrupeds, whose appetite for animal food is e most vehement, and whose means for satisfying this appetite are the most rious, as nature furnishes him with strength, cunning, agility, and every quisite for pursuing, overtaking, and conquering his prey. Yet, with all ese advantages, he frequently dies of hunger; being obliged to fly from man habitations, and to live in the forest; where the wild animals either ude him by their art or swiftness, or the supplies are too small to satisfy s rapacity. He is naturally dull and cowardly; but when pressed by hun-r, he braves danger, and even ventures to attack animals under the protec-on of man; as lambs, sheep, and even dogs. When his excursion proves ccessful, he returns to the charge, until being wounded, or hard pressed, by e shepherds or their dogs, he retires to the thickest part of the forest, con-nt to pursue those smaller animals, which, even when taken, afford him but scanty supply. However, when his necessities are very urgent, he faces rtain destruction: he attacks women and children, and sometimes even men; , becoming furious by continual agitation, he ends his life in madness.

But notwithstanding his savage disposition, the wolf, when taken young, capable of being tamed. An instance of this was exhibited in a wolf be-nging to the late Sir Ashton Lever, of Great Britain: this animal, by proper lucation, was entirely divested of the ferocious character of its species. In stern countries, wolves are exhibited as spectacles to the people. When ung, they are taught to dance, or rather to wrestle with a number of men; d one of these animals, well instructed in dancing, is said to have been sold r five hundred French crowns. Buffon brought up several wolves. During e first year, he states that they were very docile, and even caressing; and, if ll fed, would neither disturb the poultry, nor any other animals; but, that the age of eighteen months, or two years, their natural ferocity appeared, d it was requisite to chain them, in order to prevent them from running off d doing mischief.

The jackal s about the size of a terrier-dog, resembling the fox in the hind-

Jackals.

er parts, particularly the tail, and the wolf in the fore parts, especially the nose. Its legs are shorter than those of the fox, and its color is a bright yellow; whence it has been called, in latin, the "golden wolf." It is an inhabitant of the warmer regions of Asia and Africa, and generally resides in woods or rocky places. The female goes a month with young, and brings forth from five to eight cubs.

The jackal seems placed, in the scale of creation, between the wolf and the dog; adding to the savage fierceness of the former, the impudent familiarity of the latter. Its cry is a howl mixed with barking, and a lamentation resembling that of human distress. These animals seldom go alone, but in packs of forty or fifty. Every day they form a combination against the other inhabitants of the forest, and nothing can escape them; for though content to take up with the smallest quadrupeds, they have courage, thus united, to face the largest. They have very little fear of mankind, but pursue their game to their doors; enter insolently into the sheepfolds, the yards, and the stables; and if they can find nothing else, they devour even harness, boots, or shoes, and run off with what they have not time to swallow.

Ever rapacious and insatiate, they not only attack the living, but scratch up the new-made graves, disinter, and greedily devour the dead, however putrescent. In the uninhabited parts of the country, they frequently pursue during the whole night with unceasing assiduity, keeping up the cry, and at length, by great perseverance, tire down the prey; but just at the moment when going to share the fruits of their labor, the lion, the tiger, or the leopard, comes in, satiates itself upon the spoil, and leaves to its unfortunate provider merely the bare carcass.

The Barbary jackal, or thaleb, is the most adroit and active animal that can be imagined. It is about the size of the common fox, and is of a brownish fawn color. From behind each ear runs a black line, which divides into

two, extending downward along the neck. The tail is bushy, and surrounded by three dusky rings.

The cunning of these animals is pleasingly depicted in the following narration of M. Sonnini: "One day, as I was meditating in a garden in Egypt, I stopped near a hedge. A thaleb, hearing no noise, was coming through the hedge toward me; and when he had cleared himself, he was just at my feet. On perceiving me, he was seized with such surprise, that he remained motionless for some seconds, without even attempting to escape, his eyes fixed steadily on me. Perplexity was painted in his countenance, with a degree of expression of which I could not have supposed him susceptible, and which denoted great delicacy of instinct. On my part, I was afraid to move, lest I should put an end to this situation which afforded me much pleasure. At length, after he had taken a few steps, first toward one side, and then the other, as if so confused as not to know which way to get off, and keeping his eyes still turned toward me, he retired; not running, but stretching himself out, or rather creeping with a slow step, setting down his feet one after another with singular precaution. He seemed so fearful of making a noise in his flight, that he held up his large tail almost in a horizontal line, that it might neither drag on the ground nor brush against the plants. On the other side of the hedge I found the fragments of his meal; it had consisted of a bird of prey, great part of which he had devoured."

Of the different kinds of foxes, we shall only mention the arctic fox. It is smaller than the common fox, and of a bluish-gray color. The hair is very thick, long, and soft. The nose is sharp, and the ears short, and almost hid in the fur. The tail is shorter, but more bushy than that of the common fox.

The Arctic, or Red Fox of the North.

The following entertaining account of the arctic fox, is given by Steller, the Russian traveller:—

"During my unfortunate abode on Behring's island, I had but too many opportunities of studying the nature of these animals, which far exceed the common fox in impudence, cunning, and roguery. They forced themselves into our habitations by night as well as by day, stealing all that they could carry off; even things that were of no use to them, such as knives, sticks, and clothes. They were so ingenious as to roll down our casks of provisions, and then to steal the meat out with such skill, that, at first, we could not bring ourselves to ascribe the theft to them. While employed in stripping an animal

The Cross Fox.

of its skin, it has often happened that we could not avoid stabbing two or three foxes, from their rapacity in tearing the flesh out of our hands. If we buried this flesh ever so carefully, and even added stones to the weight of earth that was upon it, they not only found it out, but with their shoulders pushed away the stones. If, in order to secure it, we put any animal on the top of a high post in the air, they either dug up the earth at the bottom of the post, and thus tumbled the whole down, or one of them climbed up, and with incredible artifice and dexterity threw down what was upon it.

"They watched all our motions, and accompanied us in whatever we were about to do. If the sea threw up an animal of any kind, they devoured it before we could arrive to rescue it from them; and if they could not consume the whole of it at once, they trailed it off in portions to the mountains, where they buried it under stones before our eyes, running to and fro as long as anything remained to be conveyed away. While this was doing, others stood on guard, and watched us. If they saw any one coming at a distance, the whole troop would combine at once, and begin digging all together in the sand, till even a beaver or seabear in their possession, would be so completely buried under the surface, that not a trace of it could be seen. In the night-time, when we slept in the field, they came and pulled off our nightcaps, and stole our gloves from under our heads, with the beaver coverings, and the skins that we lay upon. In consequence of this, we always slept with our clubs in our hands, that if they awoke us, we might drive them away or knock them down.

"Whenever we made a halt to rest, they gathered around us, and played a thousand tricks in our view; and when we sat still, they approached us so near that they gnawed the thongs of our shoes. If we lay down, as if intending to sleep, they came and smelt at our noses, to find whether we were dead or alive. On our first arrival, they bit off the noses, fingers, and toes of our dead, while we were preparing the grave; and they thronged in such a manner about the infirm and sick, that it was with difficulty we could keep them off. Every morning we saw these audacious animals patrolling about among the leonine seals, and seabears that were lying on the strand, smelling at such as were asleep, to discover whether some one of them might not be dead; if that happened to be the case, they proceeded to dissect him immediately, and soon afterward all were at work in dragging the parts away. Because the seals sometimes in their sleep overlaid their young ones, the foxes every

morning examined the whole herd, one by one, as if conscious of this circumstance, and immediately dragged away the dead cubs from their dams.

"As they would not suffer us to be at rest either by night or day, we became so exasperated against them, that we killed them, young and old, and harassed them by every means we could devise. When we awoke in the morning, there always lay two or three that had been knocked on the head in the preceding night; and I can safely affirm, that, during my stay upon the island, I killed above two hundred of these animals with my own hands. On the third day after my arrival, I knocked down with a club, and within the space of three hours, upward of seventy of them, and made a covering to my hut with their skins. They were so ravenous, that with one hand we could hold to them a piece of flesh, and with a stick or axe in the other could knock them down. Like the common foxes, these animals were the most sleek and full of hair in the months of October and November. In January and February their hair was extremely thick. In April and May they began to shed their coat; in the two following months they had only wool upon them, and appeared as if they went in waistcoats. In June they produced their cubs, nine or ten at a brood, in holes and clefts of the rocks. They were so fond of their offspring, that to scare us away from them, they barked and yelled like dogs; by which they betrayed their covert: but no sooner did they perceive that their retreat was discovered, than (unless they were prevented) they dragged the young ones away in their mouths, and endeavored to conceal them in some more secret place.

"In heavy falls of snow, these animals buried themselves in that substance, and there lay as long as it continued of a sufficient depth. They were able to swim across the rivers with considerable agility. Though at this time they were found in immense numbers on Behring's island, they had probably been conveyed thither on the drift-ice from the continent, and having been afterward nourished by the great quantity of animal substances thrown ashore by the sea, they had become thus enormously multiplied."

The Giraffe.—The first and most striking characteristic of the giraffe is its lofty stature, which far exceeds that of every other known animal in the wide range of creation. Its next, and still more wonderful peculiarity, is the clustering union in which it appears to possess some trait or traits of a multiplicity of other animals, of the most varied and opposite attributes. In this respect, indeed, many of the fabulous creatures of the poets would be less remarkable in reality, and are less incredible in description. The fanciful naturalist who contends for the primary existence of microcosmical centres, or sources of diversified beings, might be pardoned for pointing to the giraffe as a living exemplar of his theory. If other animals are considered connecting links between species, a little further license of fancy might deem this creature a common ring, or compendious circle, in which many such links unite. When the good bishop Heliodorus described its hinder parts, from the loins downward to the tail, as resembling those of the lion, he might have added that its tail also resembles that of some species of the lion, and that its mane may claim affinity to some tribes of the zebra. Its head, says the bishop of Sicca, in form, was like that of the camel—far more delicately moulded, however, and tapering with much of the symmetry of the antelope. Some graceful traits of the ostrich and the swan must have been mirrored in the mind of its ancient describer, or he would scarcely have alluded to creatures so remote in their character. These traits will be sketched in the imagination at least, of every observer. The points in which it somewhat resembles the camel, are the length of its neck, and some callous appendages on the knees and the sternum. The points in which it

shows affinity to the horse and the antelope, are its legs, and some of its haunches. The feet also agree with those of the horse in bei out the spurious hoofs which mark most of the ruminant animals; l the similitude abruptly closes—for the hoofs are divided like those o with scarcely any other similarity of structure, and are altogethe those of the camel, which are less firm in texture and less ada speed.

The height of a full-grown giraffe, varies from eighteen to twe although some specimens, in their natural state, have been seen ex this by several inches. One half of this elevation consists of the ne the ears to its junction with the projecting angle of the chest; and t half consists of the fore legs, ascending to the same point. Casua vers are apt to suppose that the fore legs of the giraffe are very di tionately longer than its hind legs; yet they are in reality of equal l the apparent difference arising from the height of the shoulder, or perhaps, from the great length of the spinous processes of the scap tebræ, which descend in an angle of inclination nearly equal to the a stag thrown upon its haunches or rising from its lair. And this so much enhanced by the dorsal protuberance above the shoulder, persons are undeceived but by deliberate inspection. The front this singular animal is unique and rather uncouthly grotesque. l appears too thin, mounting lankly aloft, as it does, from a capacious lar, duo-convex chest—like a tall iron crane from the box of its w And the *tout ensemble* of this, in connexion with the very long, th which perpendicularly sustain so odd a superstructure, is not un front aspect of a real ornithological crane, as it sometimes stands fo the margin of a pool, innocent of eels, and bolt upright in its e meditations. Yet no animal exhibits a more gracefully-majestic and richly-flowing outline than this otherwise uncouth giraffe, wher in its side view, cropping the topmost leaves of high branches, or lifting its airy, vivacious head, attentive to distant sounds. Its aspect is then a charm to the eye of taste, and excites the admiration of the most indifferent spectator.

Head of the Giraffe, showing the manner tongue in gathering food.

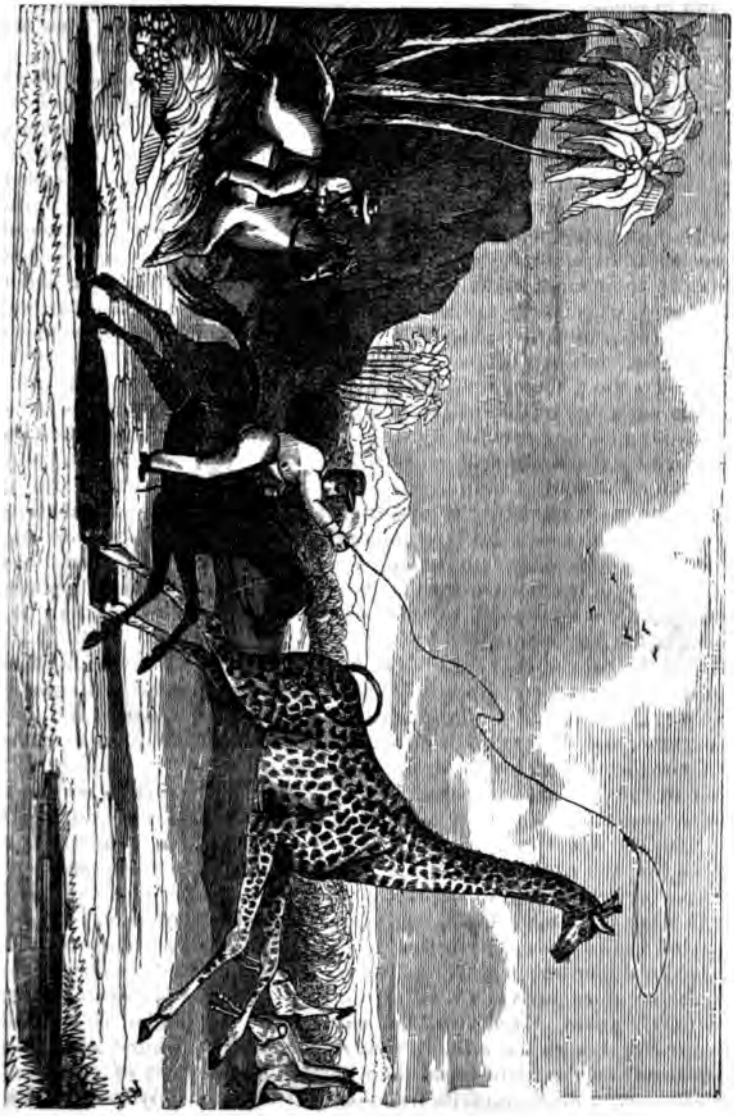
It differs from all other animals in the singular structure of those cylindrical prominences which grow upon its frontal bone, and which are, in fact, cellular enlargements of that bone, of nearly equal size unto their abrupt extremities, which are surmounted by tufts of short bristly hairs. These singular appendages are not peculiar to either sex, and, being of the same substance as the skull, of course are never shed; although, in the young specimens, they are unite skull by a distinct suture. They are not horns, nor used as such, e attack or defence; but, as though this creature was designed to be similar and dissimilar to every other, it has a third prominence, or horn, broader but not nearly so projecting as the others, articulate forehead, midway between them—as though its owner had some s

The Giraffe.

tion of becoming a unicorn. Besides these it has two bony tubercles or rudiments of horns, on each side of the main, on the occiput. The shape of the ears is peculiarly beautiful—and they are moved with brisk and spirited expression toward sounds often unheeded by the spectators whose attention has been attracted to the movement. The eyes of the giraffe are singularly large, full, and clear, soft and rich as the famed gazelle's, and fringed with very long lashes. They are situated so prominently on the sides of the head, as to excel, in advantage of position, those of the hare; and it is supposed that the giraffe can command a wider view of the horizon than any other creature. The surface of its skin is smooth, the hair being short, close, and flatly laid. The ground color is a dull white, warming to a rich cream-tint, and deepening with age to a very faintly-red brown. The spots are of a much darker brown, and of so generally regular a form and arrangement as to give the hide the appearance of being cross-barred with whitish stripes. When young, the sexes are scarcely distinguishable by their color; but, as they advance in age, the male becomes of a darker brown, and the lighter stripes are somewhat less clear; but the female retains more of her original rust-colored hue, and may be known by this contrasted tint. There is, however, some very slight variation of color in specimens of the same age, and in the same individuals at different seasons of the year.

Another singularity in the giraffe, is, that it has neither a muzzle nor lachrymal sinuses. It has no incisors in the upper jaw, but twelve grinders: in the lower jaw it has twelve grinders and eight incisors. The female has four mammæ, situated in the groin, and she gestates twelve months with foal. But the most instructive singularity in the physiology of the giraffe, and one which, above all others, determines its geographical insulation and scarcity, is the remarkable adaptation of its tongue to the food which it chiefly prefers and seeks. This coincidence seems to have escaped the attention of naturalists, and was, perhaps, first observed by Mr. Clayton. The organ is about thirty inches in length, opening nearly to a sharp point, and endowed with greater contractibility, extensibleness, and flexibility, than the tongue of any creature except the ant-eater. It is coated on the upper surface, and round its point, with a skin so hard and impervious, that it can not be cut or pierced even with a sharp knife, without great pressure. The food on which the giraffe principally subsists, in its natural state, is the foliage and juicy branches of a species of *mimosa* or acacia, called by the natives *kameel-doorn*, which is said to be peculiar to the valleys in which the animal is only known to have been seen, and to constitute their almost exclusive vegetation. This variety of the acacia abounds with very long and exceedingly-sharp spines, whose puncture is as subtile as that of a needle. Yet, protected by its wonderfully-impermeable covering, the flexible tongue of the giraffe securely threads its way through the foliaged danger, winds around the branches amid the spines, culling each particular leaf with more than manual dexterity, and incurring neither puncture nor laceration.

The localities in which alone the giraffe abounds, may be considered as holding a mean proportion between the excess of tropical vegetation and the sterility of the plantless wilderness. They are, therefore, neither absolutely scorching deserts, nor swampy woodlands—neither of which are suited to the structure of the giraffe. But they are those vast, gently undulated, stony plains, bordered by forest and desert, which form the prevailing geographical feature of the tropical regions of the deep interior of South Africa. In all these plains the thorny mimosa forms the abundant pasturage of the tall giraffe, and it so monopolizes the hard, dry soil, as to exclude the brushwood which might harbor beasts of prey. Is it remarkable that this gentlest



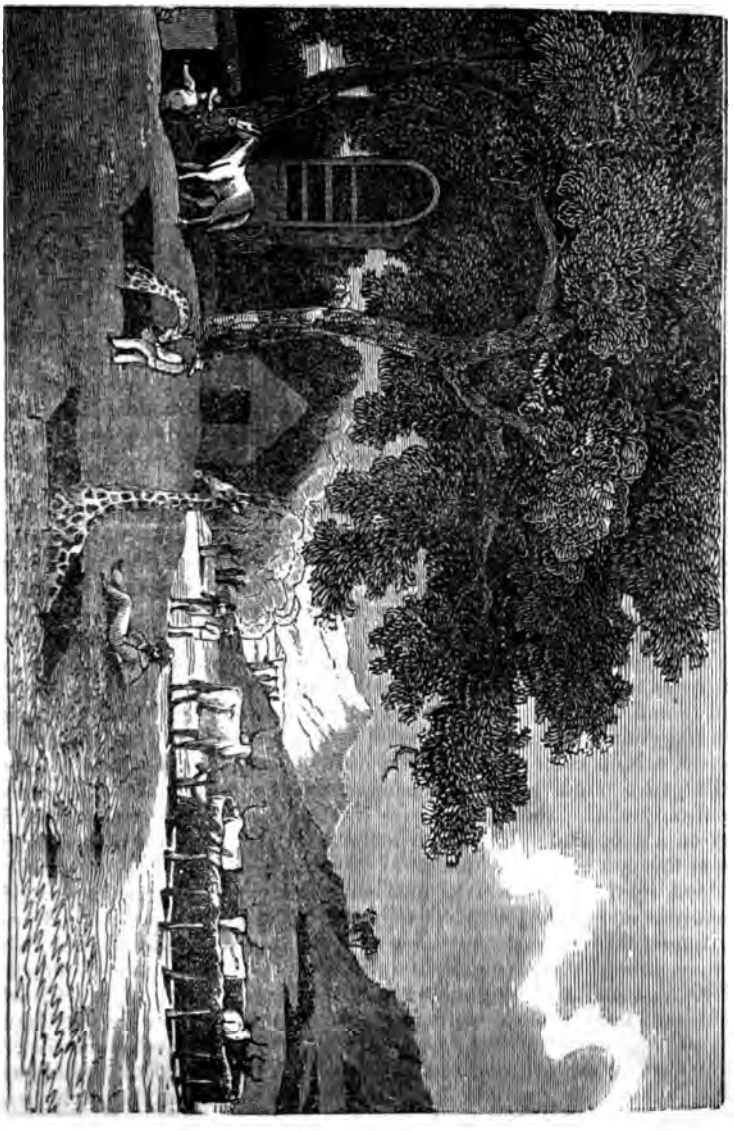
Lassoing the Giraffe.

of the ruminating family should have been found only in retreats so favora ble to its disposition, so profusely administering to its wants? It doubtless browses on the mimosa in every interior part of the continent and approaching to the tropics, but there is no evidence that it has ever been discovered in any other regions of the world than those which supply it with this particular kind of food.

Of the difficulties attending the capture of the giraffe, some idea may be formed by the following account of their capture:—

"Mr. Clayton and his party had persevered in their adventurous course far into the interior, within a few degrees of the southern tropic, before they entered any of those peculiar open plains abounding with the mimosa-tree and the giraffe. Small herds of the majestic creature were at length discerned, lifting their sprightly heads above the scattered clumps of these trees, and flying with excessive timidity at the first approach of the intruders. When thus surprised by the hunter, the giraffe appears the most wonderful and beautiful of animals. Fleet and graceful as the antelope, bright and dazzling in their mottled sleekness, and light and lofty in their action, the timid groups, exquisitely gifted with sight and hearing, collect in larger herds from their separate browsing-places, and wheeling in their perchance unnecessary flight, suddenly stop, with uplifted heads, within the aim of the destroyer. To shoot them, therefore, requires little skill; but to hunt them, so as to take even one of them alive, is a task for the best experience and adroitness. Like all other ruminating animals of a timid character, when pursued in their wild state, the giraffes take their course to the windward, and, aware of this, the experienced hunter directs his course a few points to the right or left of theirs, as if intending to pass them far ahead, and thus, while they keep their eye upon him as a doubtful pursuer, they unconsciously keep on a line to which he is constantly converging, 'and thus,' says Mr. Clayton, 'he comes into the midst of the herd, notwithstanding their superior speed, because they have to run a distance equal to about one third of a circle more than he has to perform in the same time.'

"At this crisis, the cool skill of the hunter, and the quality of his steed, are put to the severest test. Suddenly spurring toward some particular giraffe, and selecting the smallest of the herd, he throws his lasso over the lofty head of his game, and instantly springing from his horse, and holding the long coil of cord loosely in his hand, prepares for a check that will bring either himself or the giraffe to the earth. But the neck which is noosed is ever in ill chance—the first strain is a melancholy one, and the gentle captive, exhausted by the suffocating pressure, falls upon its haunches, and to the ground. Still keeping the cord in moderate tension, the cautious captor approaches his convulsive victim, and leaping astride its head, uses its long neck as a lever to keep it on the ground. If the Hottentot *achter* (rider) has been left far behind in the chase, the hunter has to maintain this ungenerous position for a tedious period; and when the multiplied coils necessary to bind the powerful creature arrive, a new difficulty, of a very opposite character, not unfrequently arises. If allowed but a moment to throw aloft its head, the vigorous giraffe, though but a foal a few months old, will burst every restraint, and spring from the earth—and then, though the gentlest of creatures, it becomes furious in defence of its freedom. It will not only strike at its assailants with its fore and hind feet, but actually pursue them, until again brought to the ground by the suffocating noose. In these struggles many giraffes expire—and even after they are secured, and placed in the wagons, they become so mutilated by struggling as to die within a few days. On the expedition now referred to, Mr. Clayton succeeded in bringing four fine foals sev



Domesticating the Giraffe.

eral hundred miles on his way back to the cape, but all of them at length died for want of milk, or other delicate nourishment suited to their age. The result of this expedition, therefore, in which the hunters suffered indescribably from heat and thirst, was a few zebras, quaggas, gnus, lions, and ostriches with which Messrs. Macomber and Handy sailed for the United States."

Of all animals, the dog is the only one, which leaving his fellows, attempts to cultivate the friendship of man. To man he looks, in all his necessities with a speaking eye for aid; for him exerts all his little services, with cheerfulness and pleasure, and bears famine and fatigue with patience and resignation; injuries can not abate his fidelity, nor distress induce him to forsake his benefactor. Studious to please, and fearing to offend, he is an humble steadfast dependant, and, in him alone, fawning is not flattery. He actually forgets the bad treatment he receives, and long retains a remembrance of favors. Even with a hard and cruel master, who, instead of feeding, strikes and torments him, far from taking the smallest vengeance on him, he does not even think of leaving him, and after seeking with risk some miserable food, he turns to follow him; when he has committed a fault, he crouches at his master's feet, and implores his clemency, but. when not fortunate enough to obtain it, he submits, without murmuring, to chastisement, and the next instant humbly licks the hand that punished him, recovers his gayety, ceases his complaint, shows himself more obedient than formerly, runs at the voice, waits the orders of his master with an ear attentive and pricked up, flies on the first signal, guesses, on the slightest motion of the eye, his inclinations, and executes them punctually. Does he lose his master, he groans, he howls most dolefully, nor takes repose till he finds him; he discovers his track, often pursues his steps even many miles, and finds him amid the greatest crowd. And in journeys, what services do dogs render us; one is of more consequence to our safety than ten domestics; he prevents any person coming near the baggage or the apartments, and still less the person of his master, and watches carefully over everything belonging to him, or near him.

In the savage state, the dog's irritable and ferocious disposition, renders him a dangerous enemy to other animals, but when domesticated, his only object seems to be to please his employers, and convert to their service all his striking and valuable instincts, his courage and his swiftness. His vigilance over everything committed to his charge, is connected with a courage in its defence, arising even to rage. His suspicions are perpetual, his inferences, on the just grounds of apprehension, astonishingly judicious and correct, and he not only alarms the whole family which employs him as sentinel, but he darts on a supposed culprit, with a vigor and intrepidity that generally overwhelm the power of resistance.

Aided by the faithful dog, man has reduced the other animals to slavery. Dangerous and ferocious beasts are hunted down by its means. By conciliating among the various animals by which he was surrounded, those which, at the same time that they abound in energies, are also capable of affection and obedience, man has been enabled to oppose and destroy others with which he would have been able to establish no compromise; whose ferocity is untameable, and whose power is connected only with ravage and desolation.

The care of the dog in directing the steps of the blind, deserves particular notice; a blind beggar was led through the streets of Rome, by a middle-sized dog, which, besides conducting his master in safety, distinguished the streets, and the houses where he was accustomed to receive alms; he regularly stopped at every door where he had formerly been successful, and lay down to rest, when the beggar began his petition. As soon, however, as the blind man was either denied relief or served, the dog rose of his own accord,

The Bloodhound.

The Thibit Dog.

and, without order or sign, proceeded to the next house where charity had usually been bestowed. "I have observed," says Ray, "with both pleasure and surprise, that when a piece of money was thrown from a window, the dog would search for it take it up in his mouth, and place it in his master's hat. Even when victuals were thrown down, the animal would not taste, unless he received it from the hands of his owner."

Of docility, the dog exhibits daily instances; it will be sufficient to mention a few. A grocer's dog at Edinburgh was one day treated with a pie, by a man whose business it was to sell penny pies in the street with a bell. Next time he heard the pieman's bell, he ran up to him, and seizing him by the coat, would not suffer him to pass. The pieman, aware what the dog wanted, showed him a penny, and pointed to the dog's master, who stood at the door, observing this curious transaction. The dog immediately quitted his hold, and began to supplicate his master, who, putting a penny in his mouth, the creature instantly delivered it to the pieman, and received his pie; and this traffic was daily carried on for several months.

Instances have occurred of a dog being taught to go to market with money, and carry home provisions in safety. Some years ago, the keeper of a turnpike-gate had trained his dog to go to a neighboring town for small articles he wanted. A note mentioning the things was tied round the dog's neck; and, in like manner, the purchases were returned, and brought to the master with the utmost punctuality.

At Hanley, Staffs, a plumber trained his dog to mount a ladder, and carry up or down any implement or utensil, and the diligence and care constantly evinced, amply compensated any trouble connected with the tuition.

At a French convent, before the revolution, at a certain hour, on ringing a bell, twenty paupers were daily relieved by a machine, which turned round in the wall, and prevented either the giver or receiver being seen. A dog, belonging to the convent, had often attended the paupers, and sometimes obtained a few scraps. One day, however, having obtained very little, after all the pensioners were gone, he took the pull in his mouth, and rang the bell, when a portion of victuals was immediately produced to him. This stratagem he repeated several times; but the cook, finding twenty-one claimants instead of twenty, determined to discover the imposition. He lay concealed, saw the paupers regularly served, and the cunning dog then ringing for his dinner. The joke pleased; and, as a reward for his ingenuity, the dog was permitted to ring the bell every day, and obtained a mess of broken victuals for his pains.

A Florentine nobleman possessed a dog which would attend his table, change his plates, carry wine to him in a glass placed on a salver without spilling a drop; and also hold the stirrup in his teeth, while his master was mounting his horse.

Leibnitz says, that a Saxon peasant had a dog of the middling size, about three years of age. The peasant's son perceiving accidentally, as he imagined, some resemblance in its sounds to those of the human voice, attempted to teach it to speak. By the lad's perseverance, the dog acquired the power of pronouncing about thirty words. It, however, only exercised this extraordinary faculty with reluctance; the words being first spoken, always by the preceptor, and then echoed by the pupil. This circumstance is attested by Leibnitz, who himself heard it speak.

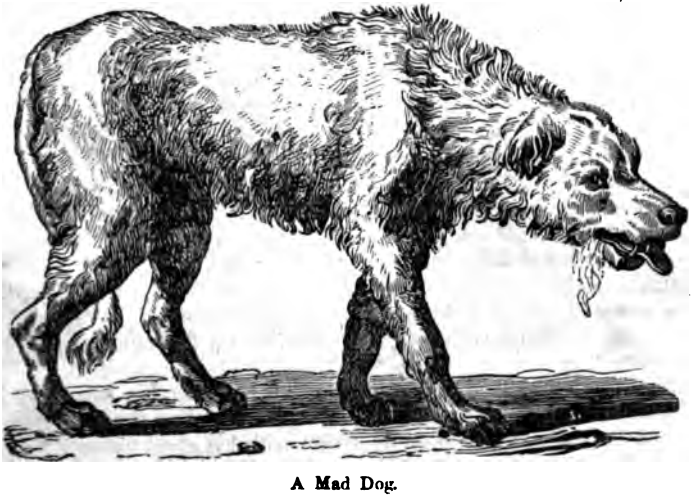
A servant of a gentleman at Manchester had taken out two coach-horses to water at a large stone trough, accompanied by a dog, who had long exhibited a marked attachment to one of the horses. The dog was attacked by a large mastiff, and in danger of being worried, when the horse (his

end), which the servant led by a halter, suddenly broke loose from him, nt to the place where the dogs were fighting, and with a kick of one of heels struck the mastiff from the other dog, into a cooper's cellar oppo- e; and having thus rescued his companion, returned quietly with him to ink at the conduit.

A most singular act of kindness occurred in a greyhound bitch, toward a t and her kittens. TWINK had long shown a partiality for this cat, and ould suffer the cat to lie upon her, when basking before the fire, and when e bitch was tied up at her kennel, she was often attended by puss. How- er, puss having kittened in a barn about thirty yards from the house, brought it her young family, to convey them across the yard; but, her progress ing arrested by a hollow drain for water, about four feet wide, she ex- bited strong symptoms of distress; these were observed by Twink; hav- g attentively considered the situation of poor puss, she walked through e water, and carefully taking the kittens, one by one up in her mouth, she id them without injury in a dry place, on the side next the house. The it now followed, and expressed her gratitude in the most extravagant man- er, standing on her hindlegs, purring, and licking the face of the greyhound. 'wink was not less pleased, and showed her satisfaction much in the same ray.

Dogs are commonly brought forth blind; the two eyelids are not simply lued together, but shut up with a membrane, which is torn off as soon as he muscles of the upper eyelids acquire strength sufficient to overcome this bstacle to vision, which generally happens the tenth or twelfth day. In wo months they learn to use all their senses; their growth is rapid, and hey soon gain strength. The female goes with young about nine weeks, or sixty-three days (never less than sixty); she produces six, seven, and sometimes twelve puppies, and generally has fewer at the first than at sub- sequent litters.

The dog lives from ten to fourteen years; and his age may be discovered by his teeth; when young they are white, sharp, and pointed; as he in- creases in years, they become black, blunt, and unequal; and his age may likewise be known by the hair, which turns gray on the muzzle, front, and



A Mad Dog.

round the eyes. The dog will breed with the wolf and the fox; and the issue of this union will breed, not only with other wolves and foxes, but also among themselves. Dogs are liable to many diseases; the most dreadful of which, not only as it effects the animal himself, but as it endangers the safety of man and other animals, is that which we usually call canine madness, though the disease is liable to be produced in some other quadrupeds as well as the dog. The symptoms of approaching madness are many, and easily discerned. When a dog secludes himself contrary to his former use, becomes melancholy or droops his head, forbears eating, and as he runs snatches at everything; if he often looks upward, and his stern at his setting on be a little erect, and the rest hanging down; if his eyes be red, his breath strong, his voice hoarse, and he drivels and foams at the mouth, we may be assured he has this distemper. The bite of the animal in this state is certainly fatal, unless the piece bitten be fairly and entirely cut out. Experience has repeatedly shown that no medicine, wash, or other remedy, though many have been (wickedly, we think) recommended as infallible, ought to be trusted to in any instance.

The wild dogs most probably descend from the wolf. To this primitive race, the animal which approaches nearest is the shepherd's dog; the breed being preserved purest in the north of Scotland. Notwithstanding his ugliness, and wild melancholy aspect, the shepherd's dog *(canis domesticus)* is superior to every other in the exercise of his instinctive powers. He is born fully trained; guided solely by natural powers to keep flocks, he applies himself spontaneously with the greatest care and success. In large tracts of land, appropriated to feed sheep and other cattle, immense flocks range over extensive wilds, without control; but their watchful guardian, the dog, under the direction of the shepherd, prevents their straggling, and leads them to each part of their pasture, suffering no stranger to intrude. In the shepherd's absence, the dog keeps the flock together, and at the well-known signal, though the distance may be great, safely conducts them to his master

A remarkable conformation of the feet is observed in the shepherd's dog: all of them have one, sometimes two superfluous toes, apparently without muscles, and dangling at the hind part of the leg, more like an unnatural excrescence, than a necessary part of the animal.

The shepherd's dog has been known to remain several days watching and protecting the flock, during the accidental absence of his master, and, such is his fidelity that he would sooner die than quit his charge. He possesses also the amiable qualities of other dogs.

Somewhat allied to this species, is the cur dog, a trusty and useful servant to the farmer and grazier. These dogs are larger, stronger, and fiercer, than the shepherd's dog, and their hair is smoother and shorter. They are chiefly employed in driving cattle, and in the north of England are called colly dogs. This race is now generally used, and much attention is paid to the breed.

The bull-dog has altogether a fierce and unpleasing appearance, a large thick head, short nose, and the under jaw shorter than the upper. His courage in attacking the bull is well-known, his fury in seizing, and invincible obstinacy in maintaining his hold, are equally wonderful. It is very dangerous to approach the bull-dog without precaution, as he frequently bites without previously barking.

The mastiff is larger and stronger than the bull-dog, his aspect is sullen, and his bark terrific. Yet he commands respect, rather than excites terror, unless when his duty comes in competition with his good nature. The mastiff, pure and unmixed, is now seldom met with, the generality of dogs so denominated, being compounded of the bull-dog, the Dutch mastiff, and the

ban-dog, which latter variety is smaller, more active and vigilant, but less powerful than the mastiff. The mastiff is employed to guard our yards, and will often suffer a stranger to come within his province, and will peaceably accompany him as long as he forbears touching anything, but the moment he attempts to lay hold of any article on the premises, or to leave the place, the animal begins to growl, and convinces him that he must neither steal nor depart. He seldom, however, uses violence unless resisted, and even then he will vanquish, but not injure the intruder, holding him down, without biting, for hours, unless he is earlier relieved. Notwithstanding the mastiff's ferocious disposition, a bitch has been known to suckle two lambs, the ewe being lost, and the bitch having been deprived of her puppies.

The mastiff is perfectly conscious of his superior strength, and will, sometimes, with great dignity, chastise the impertinence of an inferior. A large mastiff dog, belonging to a gentleman who resided at Heaton, near Newcastle, being teased by the barking of a mongrel, took it up in his mouth, by the back, and, with great composure, dropped it over the quay into the river without taking any other revenge on an adversary so contemptible.

Russian Hound.

With this animal may be ranked the harrier, and the fox-hound: the former employed in hunting the hare; and the latter, stronger and fleeter, for chasing the fox.

There are several kinds of harriers, each of which has its excellence; according, perhaps, to the country where it is employed; or, in some instances, to the whim or fancy of the owner. The southern hound is very slow, but will hold out in a chase many hours. Its cry is deep and fine; and the whole pack generally keep well together, from the nearly equal speed of the dogs. In open countries, where there is good riding, a species of this

dog is preferred that is fleet of foot, having sharp noses, narrow ears, deep chests, with thin shoulders.

Beagles are nimble and vigorous, pursue the hare with impetuosity, do not give her time to double, and if the scent lies high, will easily run down two brace before dinner. They are not, however, always to be depended on, and require the constant discipline of the whip, and to be perpetually hunted, to make a good pack.

A perfect harrier should be of the middle size, with a broad, rather than a round back. His nose should be large, nostrils wide, chest deep and capacious, fillets great and high, haunches large, and hams straight. The feet should be round, the soles hard and dry, and the claws large. The ears should be wide, thin, and more than sharp; the eyes full, forehead prominent, and the upper lip thick, and deeper than the lower jaw.

The Fox Hound.—In England, the utmost attention is paid to the breeding, education, and maintenance of this animal, and its value has, consequently greatly increased, a pack of favorite hounds having fetched the enormous sum of one thousand guineas.

Hounds, to look well, should be nearly of a size; their color is not an object, except as it regards beauty. Height and shape are more important. The legs of a hound should be straight, feet round and not too large, shoulders lying back, breast rather wide than narrow, chest deep, back broad, neck thin, head small, tail thick and bushy, and which, if he carries well, will add to his comeliness. Though a small head is one requisite of a fox-hound, this regards beauty only, for large-headed hounds are not inferior in goodness.

Of the long-continued speed and astonishing exertions of fox-hounds, we have many instances. On the 8th of June, 1808, near Dunkeld, in Perthshire, a fox and a hound were seen on the high road, proceeding at a slow trotting pace. The dog was about fifty yards behind the fox, and each was so fatigued as not to gain upon the other. A countryman easily caught the fox by running, and both the fox and the dog were taken to a gentleman's house in the neighborhood, where the fox died. It was afterward ascertained that the hound belonged to the Duke of Gordon, and that the fox was started on the morning of the king's birthday, on the top of those hills called Monaliadh, which separate Badenoch from Fort Augustus. From this it appeared that the chase lasted four days, and that the distance travelled from the place where the fox was unkenneled, to the spot where it was caught, without making any allowance for doubles, crosses, and tergiversations, exceeded seventy miles.

The terrier is a small rough hound, with a most acute smell; the natural enemy of rats, mice, weasels, and other vermin. He possesses such courage as to attack even the badger; nor can the most resolute opposition daunt his ardor. He is likewise employed to drive the fox from his hole, and is therefore a particular favorite with sportsmen, and highly esteemed as a domestic companion. A variety of the terrier, marked with white, tan-color, and black, has been lately introduced into some parts, and, being rather scarce at present, are proportionably valued. They possess many agreeable qualities, have the spirit of sporting dogs, the attachment of the most faithful of the kind, and the elegance of the lapdog. That terriers are susceptible of many of the passions which agitate mankind, and no small share of address, is manifest by the following anecdote: a gentleman from Swimmerton, near Stone, Staffordshire, used to go twice a year to London, on horseback, accompanied by his terrier; but for fear of losing it in the metropolis, he always left it in the care of his landlady, at St. Alban's. Once, however, the large housedog of the inn and the terrier guest, having a quarrel, the latter

English and Scotch Terriers.

was so much overmatched, that it was with difficulty he could crawl; he went silently away out of the yard, and for a week no one knew what was become of him. He then returned, and brought with him a friend, a dog both larger and stronger than that by which he had been beaten, and they both fell upon the former victor, and beat him most unmercifully, leaving him half dead. The terrier and his friend again disappeared, and, as this happened while the gentleman was in London, when he called, in his way home, at St. Alban's, he had the mortification to hear the above particulars, and gave up his dog for lost. On arriving at his home, however, he found his terrier safe, and, on inquiry into the circumstances, ascertained that he had returned on being first missed from St. Alban's, and had coaxed away the great housedog, with which he proceeded to avenge the injuries he had received, and then came home in quiet with his companion.

At Dunrobin castle, in Sutherlandshire, the seat of the Marchioness of Stafford, there was, in May, 1820, to be seen a terrier-bitch nursing a brood of ducklings. She had had a litter of whelps a few weeks before, which were taken from her and drowned. The unfortunate mother was quite disconsolate till she perceived the brood of ducklings, which she immediately seized and carried to her lair, where she retained them, following them out and in with the greatest attention, and nursing them after her own fashion with the most affectionate anxiety. When the ducklings, following their natural instinct, went into the water, their foster-mother exhibited the utmost alarm, and as soon as they returned to land, she snatched them up in her mouth and ran home with them. What adds to the singularity of the circumstance is, that the same animal, when deprived of a litter of puppies the year following, seized two cock-chickens, which she reared with the like care she bestowed on her own family. When the young cocks began to try their voices, their foster-mother was as much annoyed as she formerly seemed to be by the swimming of the ducklings, and never failed to repress their attempts at crowing.

The following anecdote, related by Mr. Blaine, is a pleasing proof of canine sagacity, and occurred in the parish of Marylebone, London: "A servant had carelessly left a child, four years old, alone, whose cap caught fire from a candle with which she was amusing herself. A small terrier, observing the situation of the child, ran up stairs to the room where the servant was, and barked most vehemently, nor would he cease till she came down, by which assistance was obtained. Had it not been for the intelligence of the dog, the poor child, instead of being only slightly scorched, would most probably have lost its life, for the accident happened in the kitchen, and the domestic left in charge of it had gone to the very top of the house, out of the reach even of the cries of the infant."

The Pointer.—The pointer of Spanish extraction was unknown to our ancestors. The large Spanish pointer's sense of smell is very delicate; but he can not endure so much fatigue as the English pointer.

Such is the steadiness of this dog, that one belonging to Colonel Thornton actually kept his point for more than an hour, while an artist sketched him in that attitude. Deane mentions a very extraordinary instance of the pointer's sagacity. A sportsman, on returning from his day's diversion, was accustomed to discharge his piece at magpies, crows, &c. The dog always kept behind at a little distance, to avoid frightening the birds. On one occasion, however, a magpie, perched in the top of a large oak, escaped the sportsman's notice. The dog, ever attentive to his master's pleasure, peeped into the tree, and espying the party-colored bird, ran to his master, who was some yards from the place, took hold of the tail of his coat, and gave it a

smart pull. The gentleman, in surprise, turned to see what was the matter, when the dog immediately trotted back to the tree, and showed him the bird, which was very soon despatched.

THE NEWFOUNDLAND DOG.—There faithful and sagacious animals, now commonly used instead of the mastiff to guard our houses, were originally brought from Newfoundland, where the settlers employ them in bringing wood in sledges, from the interior parts of the country down to the seacoast. Their strength is very great, and their docility remarkable. They are web footed, and, therefore, calculated to swim with great facility, in consequence of which they have saved numbers from a watery grave. Nor is it their masters only that they will endeavor to assist; they seem naturally disposed to rescue from the water any being that is in danger of perishing.

In 1792 a gentleman at Portsmouth, bathing in one of the machines, unacquainted with the steepness of the shore, and no swimmer, was soon out of his depth. His danger was not noticed by the person whose business it was to attend him, and probably he would have perished, had not a Newfoundland dog on the shore providentially seen the accident, and, swimming to his assistance, dragged him to the beach in a state of insensibility, from which it was some time before he recovered. The gentleman purchased his preserver at a great price, and considered him as his most valuable property.

During a violent storm, in 1789, a ship, belonging to Newcastle, was lost near Yarmouth, and only a Newfoundland dog escaped alive, which swam ashore with the captain's pocketbook in his mouth. He landed amid a concourse of people, attracted together by the catastrophe, several of whom attempted, but in vain, to rob him of his prize. The sagacious animal, as if conscious of the importance of the charge, which perhaps was intrusted to him by his perishing master, at length selecting a person who seemed worthy of his confidence, he leaped in a fawning manner upon him, and delivered the book to him. This duty discharged, he returned to the place where he had landed, and anxiously watched and seized every article that was driven ashore from the wreck.

A Newfoundland dog kept at the ferry-house at Worcester, was famous for having, at different times, saved three persons from drowning; and so fond was he of the water, that he seemed to consider any disinclination for it in other dogs as an insult to the species. If a dog was left on the bank by its master, and, in the idea that it would be obliged to follow the boat across the river, which is but narrow, stood yelping at the bottom of the steps, unwilling to take the water, the Newfoundland veteran would go down to him, and with a satirical growl, as if in mockery, take him by the back of the neck and throw him into the stream.

A native of Germany, fond of travelling, was pursuing his course through Holland, accompanied by a large Newfoundland dog. Walking one evening on a high bank, which formed one side of a dike, or canal, so common in that country, his foot slipped, and he was precipitated into the water, and, being unable to swim, he soon became senseless. When he recovered his recollection, he found himself in a cottage on the opposite side of the dike to that from which he had fallen, surrounded by peasants, who had been using the means so generally practised in that country for restoring animation. The account given by the peasants was, that one of them returning home from his labor, observed, at a considerable distance, a large dog in the water swimming, and dragging, and sometimes pushing, something which he seemed to have great difficulty in supporting, but which he at length succeeded in getting into a small creek on the opposite side to that on which the men were.

When the animal had pulled what he had hitherto supported, as far out of the water as he was able, the peasant discovered that it was the body of a man. The dog, having shaken himself, began industriously to lick the hands and face of his master, while the rustic hastened across, and, having obtained assistance, the body was conveyed to a neighboring house, where the usual means of resuscitation soon restored him to sense and recollection. Two very considerable bruises, with the marks of teeth, appeared, one on his shoulder, the other on the nape of the neck; whence it was presumed that the faithful animal first seized his master by the shoulder, and swam with him in this manner for some time; but that his sagacity had prompted him to let go his hold, and shift his grasp to the neck, by which he had been enabled to support the head out of the water. It was in the latter position that the peasant observe the dog making his way along the dike, which it appeared he had done for a distance of nearly a quarter of a mile. It is therefore probable that this gentleman owed his life as much to the sagacity as to the fidelity of his dog.

The Spaniel.—This dog, though named hispaniolus, or spaniel, from the country whence we originally derived the breed, is now so completely naturalized that it may be considered an American animal. Dogs of this kind vary in size from the setting dogs to the springing spaniels, and some of the small lap-dogs. The Blenheim breed, a beautifully-marked variety, is the most fashionable, at present, for dogs of pleasure, being frequently sold at from twenty to fifty dollars each; but fancy gives them such a value.

Spaniels are affectionate, playful creatures, without any marked character; yet not destitute of sagacity. Some years ago, a gentleman presented to a friend going on the continent, a little favorite spaniel, which was carried to Brussels; and, after a few days, disappeared. His new master, in the first letter he wrote to England, with regret mentioned the loss of the dog, to his former master, who had scarcely read it before he heard a scratching at the street-door. On opening it, the identical little dog was waiting to obtain admittance. It had found its way from Brussels, in safety, by some conveyance never accounted for, and had travelled almost as quick as the mail.

King Charles's breed, as they are called, are distinguished by their black color, and black palate. For this breed Charles II. was celebrated; and so partial was he to it, that he generally came to the council board, accompanied by a favorite spaniel. His successor, James II., had a similar attachment; and Bishop Burnet reports of him, that being once in a violent storm at sea, and compelled to quit the ship to save his life, he vociferated with impassioned accents, "Save the dogs and Colonel Churchill."

Of maternal kindness in the spaniel we have to record a singular example, where the partition between instinct and reason seems very slight indeed. A favorite bitch had three puppies; two strong and healthy, the third very weakly; as often as the latter attempted to suck, it was driven away by the two others, and scarcely received any sustenance; at length the mother determined on the following expedient to save the life of her offspring: Whenever the sickly puppy showed any desire to suck, she immediately took it in her mouth, and ran into the family sitting-room, as if to seek the protection of the females, and there suckled her puppy in safety. This act of maternal kindness was performed a long time, and concluded in rendering the object of it strong and healthy.

In the warm summer day, the red squirrels my be seen skipping around the trees and fences, gathering their winter's store of nuts and acorns. The visiter may amuse himself for hours in watching their active gambols, but to

the farmer their visits are by no means pleasant. A late writer states the following particulars in regard to them :—

"During our voyage, just at the head of the rapids, our attention was drawn to some small object in the water, moving very swiftly along; there were various opinions as to the swimmer, some thinking it to be a water-snake, others a squirrel, or a muskrat; a few swift strokes of the paddles brought us up so as to intercept the passage of the little voyager; it proved to be a fine red squirrel bound on a voyage of discovery from a neighboring island. The little animal, with a courage and address that astonished his pursuers, instead of seeking safety in a different direction, sprung lightly upon the uplifted paddle, and from there with a bound to the head of my astonished babe, and having gained my shoulder, leaped again into the water, and made direct for the shore, never having deviated a single point from the line he was swimming in when he first came in sight of our canoe. I was surprised and amused by the agility and courage displayed by this innocent creature; I could hardly have given credence to the circumstance, had I not been an eyewitness of its conduct, and moreover been wet plentifully on my shoulder by the sprinkling of water from his coat. Perhaps you may think my squirrel anecdote incredible, but I can vouch for the truth of it on my own personal experience, as I not only saw, but felt it. The black squirrels are most lovely and elegant animals, considerably larger than the red, the gray, and the striped. The latter are called by the Indians 'chitmunks.'

Red Squirrels.

"These little animals are very fond of the seeds of the pumpions, and you will see the soft creatures whisking about among the cattle, industriously engaged in carrying away the seeds as they are scattered by the beasts in breaking the pumpions; they also delight in the seeds of the sunflowers, which grow to a gigantic height in our gardens and clearings. The fowls are remarkably fond of the sunflower seeds, and I saved the plants with the intention of laying up a good store of winter food for my chicks. One day I went to cut the ripe heads, the largest of which was the size of a large dessert-plate, but found two red squirrels busily employed gathering in the seeds, not for me, be sure, but themselves. Not contented with picking out the seeds, these little thieves dexterously sawed through the stalks, and conveyed away whole heads at once, so bold were they, that they would not desist when I approached till they had secured their object, and, encumbered with a load

twice the weight of their own agile bodies, ran with a swiftness along the rails, and over root, stump, and log, till they eluded my pursuit.

"Great was the indignation expressed by this thrifty little pair on returning again for another load, to find the plants divested of the heads. I had cut what remained and put them in a basket in the sun, on a small block in the garden, close to the open glass-door, on the steps of which I was sitting shelling some seedbeans, when the squirrels drew my attention to them by their sharp scolding notes, elevating their fine feathery tails, and expressing the most lively indignation at the invasion. They were not long before they discovered the Indian basket with the ravished treasure; a few rapid movements brought the little pair to the rails within a few paces of me and the sunflower heads; here, then, they paused, and sitting up, looked in my face with the most imploring gestures. I was too much amused by their perplexity to help them, but turning away my head to speak to the child, they darted forward, and in another minute had taken possession of one of the largest of the heads, which they conveyed away, first one carrying it a few yards, then the other, it being too bulky for one alone to carry it far at a time. In short, I was so well amused by watching their manœuvres, that I suffered them to rob me of all my store. I saw a little family of tiny squirrels at play in the spring on the top of a hollow log, and really I think they were, without exception, the liveliest, most graceful creatures I ever looked upon."

Far removed from the reindeer and other northern species of the genus in character and general appearance, the axis forms the type of a tribe of deer inhabiting the warmer climates of eastern Asia, and distinguished by the peculiar conformation of their horns. These appendages, in all the species of the axis or rusa tribe, are in their adult state furnished with no more than two simple branches or snags, the one originating from the stem near its base, and the other taking its rise considerably above the middle, and forming with the continuation of the stem, a kind of terminal bifurcation. The horns themselves are either perfectly sessile, or elevated only on short cylindrical processes. Notwithstanding their simplicity and the general uniformity of their character, they are subject to no little variation in the comparative size, length, and direction of their ramifications; and numerous species have been founded by authors, and in particular by M. Cuvier and M. Blainville, on the most trifling modifications in these particulars. It is necessary to observe these animals for several successive years, in order to distinguish with precision the characters which are permanent from those which are of a temporary and transitory kind.

The AXIS DEER is the earliest and best known species of the Indian group. In size, form, and the general distribution of its colors, it is extremely similar to the fallow-deer of Europe, with which it has frequently been compared. So close indeed is the resemblance, that it is sometimes difficult to distinguish between the females of the two races in their summer-coat without a minute comparison. In the males the horns alone afford at the first glance, a clear and unequivocal mark of distinction. These organs rise almost vertically from the head, take a slight curvature outward, and turn a little forward and inward at their points. The lowermost antler or snag rises close to the base on the anterior surface, and is directed forward and upward; the upper takes its origin above the middle and from the inner side. The stems and their branches are perfectly cylindrical throughout, with a somewhat rugged and tubercular surface, and they never form the flattened and palmated expansions which distinguish those of the fallow-deer.

In both of these species, the color of the back and sides is fawn spotted with white; a brown or blackish band occupies the middle line of the back,

and an almost continuous white line passes along either side of the belly between the limbs. But the head, which in the fallow-deer is of a uniform grayish-brown, is marked in the axis by a broad dusky spot on the forehead, and a line of the same color extending along the middle of the nose. The chin and throat of the axis are pure white, while in the fallow-deer they are of nearly the same color with the chest and under surface of the body, which are both of a grayish hue. The buttocks of the fallow-deer are occupied by a broad white patch, separated from the fawn of the back and sides by a black band, and the tail is black above and white beneath. In the axis the buttocks are of the same color with the adjacent parts, and the tail is tawny above and white beneath, with a narrow blackish border toward the tip.

Such are the principal differences in color between the most nearly approximating individuals of the two species; but it is only during the summer that any similarity exists, for the fallow-deer in winter changes to a uniform brown, while the axis retains its spotted livery throughout the year. In form, the most remarkable distinctions consist in the rather larger size of the axis, in the somewhat more elongated and pointed shape of its head, and in the sub-orbital fissures, which are of large size in the fallow-deer, and are of little depth in the Indian species, in which their place is strongly marked by a

The Axis Deer.

patch of reddish hairs. The axis appears to be common in India and the larger islands of the Indian archipelago, but is most abundant in Bengal, and on the banks of the Ganges. There can be little doubt that it is the animal mentioned by Pliny, under the name which was adopted from him by Belon, and employed for it by all subsequent writers. Considerable numbers have been brought to England during the last century, and have thriven extremely well in the menageries and occasionally in open parks, propagating freely in captivity. It is even stated, on the authority of Peter Collinson, that a mixed progeny has been obtained between them and the fallow-deer. They are singularly mild and quiet in their disposition, but their gentleness is not unmixed with timidity, which often degenerates into suspicion. Pennant observes that their sense of smell is so acute, that, although fond of bread, which they readily take from the hands of visiters, they will not touch it if

ave previously been blown upon, and M. F. Cuvier tells us that they will even accept it, if it have been much handled. This extreme sensibility smell, and squeamishness of palate, is not, however, we may remark, con-d to the axis, but is common to the whole of the deer and antelope tribes.

'HE CIVET.—The name civet was unknown to ancients. It is derived n an Arabic word sig-ying perfume, and it was doubt originally used in rope to designate only drug which is produced the civet. This drug for years been an ob-t of considerable com-rce. Its qualities in dicine have been highly oken of; and, in former nes, it was considered so lightful a perfume, as fre-ently to be carried about clothes of persons when l-dressed. Civet is oc-

The Civet.

sionally used in the present day, in the composition of medicines, but its nsumption has been surprisingly diminished of late years. It is imported m India and Africa into the continental parts of Europe, chiefly by way Alexandria and Venice; and sometimes the animals which produce it, are so imported as objects of curiosity. Cardon and Scaliger have had them Italy, Agricola and Kentmann in Germany, and Caius in England. Belon forms us that he saw one at Alexandria, and afterward, when the taste for tural history became more general, they were to be found in several of e menageries of Europe. The academicians of Paris dissected five, and lasius, Swammerdam, Moraud, and Peyronie, each one. Still, however, it as not discovered that two species were confounded under the same name. uffon was the first who distinguished them. He remarked that in one of ese the tail was longer than in the other, and was neatly marked with ack and white annules, while the other had a tail shorter and less various color; that the latter had likewise a kind of mane, capable of being ected and depressed, which the former had not, and that its muzzle was ss sharp. To the species with a mane, he reserved the name of civet, and the other, with a long and annulated tail, he gave the denomination of beth.

The civet measures two feet three or four inches in length, exclusive of e tail; and from ten to twelve inches in height at the shoulder. Its muz-e is somewhat less pointed than that of the fox, yet sharper than that of the arten. Its ears are rounded and short. Long whiskers ornament its lips. he thumbs or inner toes, particularly those of the hind feet, are much orter than the others. The hair with which its body is clad, is long, and mewhat coarse. That, particularly, which extends along the middle of the ck, from the neck to the tail, forms a kind of mane which the animal has e power of erecting and depressing at pleasure, and which it always erects ien irritated. The hairs of the tail are tufted, and those on the upper rt are capable of being raised in the same manner as the mane. The gen-l color of the animal is a dark grayish brown, varied with spots and in-

terrupted stripes of blackish-brown. A band of the latter color extends from the back of the head almost to the extremity of the tail. The sides of the body are marked with irregular spots, which are largest upon the rump and thighs. All the legs, as well as the posterior half of the tail, are of a uniform black-brown. The base of the tail has three or four annules of the same color. The head is whitish; but a brown band, after encircling the eye, descends along the cheek, and beneath the chin.

The substance is taken from the animals when alive in a domestic state, or it is collected from the rocks and shrubs on which the wild civet deposites it. It is easily ascertained when they have a superabundance, by the uneasiness which the animals show, and a state of agitation that at other times is not observable. In order to collect it from them, they are seized by the feet, and a small spatula is introduced into the pouch which contains it. Their sweat emits also a musky kind of scent, and it has been said, but without any appearance of probability, that this is frequently mixed with the true civet, for the purpose of augmenting the quantity. The males yield more civet than the females, though the odor of the latter is twice as strong as that of the former. This odor is insupportably powerful when the civet is fresh, and it is not until after a great while that it becomes so weakened as to be agreeable. Civets are fond of sugar, eggs, and small birds, but particularly of fish, and the better they are fed, the more profitable, a great deal, will be the perfume.

The Jerboa.—This animal, remarkable for the singular construction of its legs, is found in Egypt, Barbary, and Palestine.

The Jerboa.

It is somewhat less than a rat; its eyes are large and full; the forelegs are only one inch in length, and are used as hands to convey victuals to its mouth; the hind legs are naked, and very much resemble that of a bird, having only

ree toes on each, the middle one longest; its tail is much longer than its ody, and terminated with a black tuft, the tip of which is white; its hair is ng and soft, of a reddish color on the back; the under parts of the body are hite: across the thighs there is a large black band, in the form of a cres-ent. Its motions are similar to those of the kangaroo. It goes forward ery nimbly on its hind feet, taking leaps of five and six feet from the ground. t is a lively, harmless animal, lives entirely on vegetables, and burrows in e ground like a rabbit. It is fond of warmth, making its nest of the finest nd most delicate herbage, and seems sensible of the approach of bad eather, by wrapping itself up close in hay, with its head between its highs. It sleeps during winter without nourishment.

Jerboas walk on their hind legs, their fore legs being very short, and, at he approach of danger they immediately take to flight, in leaps six or seven eet high, which they repeat so swiftly, that a man on horseback can scarcely vertake them. They jump first to one side, and then to the other, till they ind either their own burrow, or some neighboring one. In leaping, they stretch out their tails, but in standing or walking, they carry them in the form of an S. If surprised, they sometimes go on all fours, but they soon recover their attitude of standing on their hind legs like a bird. When undisturbed they use the former posture, they then rise erect, listen, and hop about like a crow. In digging or eating, they drop on their fore legs, but in the latter action, they often sit upright like a squirrel.

The Siberian jerboas, says Sonnini, are so tender, that it is very difficult to transport them into other climates; but, as an indispensable precaution to those who attempt it, he advises that they be closely shut up in strong cages, or in other conveniences, without any possibility of escape, for their natural disposition inciting them to gnaw whatever comes in their way, they may occasion considerable damage to a ship in the course of her voyage, and, being able to eat through the hardest wood, may even endanger her sinking.

The Kingfisher.

SUBJECT IV.

BIRDS.

FROM beasts we now come to birds. Birds are the most beautiful of the animated tribes, and from most of them man has nothing to fear. They embellish our forests, and amuse our walks; their pleasures, notes, and even their animosities, enliven the general face of nature, and cheer the contemplative mind.

In no part of animated creation is divine wisdom more apparent than in this. Birds, by their structure and habits, are admirably adapted for their station. To compensate their want of strength, they are supplied with swiftness; and, to avoid those enemies they are not fitted to oppose, they possess the faculty of ascending into the air. They are formed for a life of escape; every part of their anatomy being calculated for swiftness; and being designed to soar on high, all their parts are proportionably light.

Though, in the scale of nature, birds are inferior to quadrupeds, as less powerful, useful, and capable of imitating human endowments, yet they far surpass fishes and insects, in the mechanism of their bodies, and their superior sagacity, and aptitude to receive instruction.

In proportion to the perfection of animals, the species are fewer. The varieties in the human race arise rather from food and climate than from nature; of quadrupeds, the kinds are numerous; birds are yet more various still; and fishes yet more; while the insect tribes are so immensely extended, that they elude the researches of the most inquisitive.

Between quadrupeds and mankind there is a little resemblance in their internal structure; but, in this respect, birds are entirely dissimilar. Formed principally to inhabit the empty regions of air, all their parts correspond with that design; their bodies being sharp before, to facilitate their passage through the yielding element, swelling in the middle, and terminating in expansive tails, which serve to keep them buoyant, while their foreparts are cleaving the air. Hence they have been compared, not inaptly, to a vessel making its way through the waves; the trunk of the body of the animal answering to the hull, the head to the prow, the tail to the rudder, and the wings to the oars.

The position of the feathers of birds, over each other, and arranged from the forepart backward, wonderfully aid them in cutting their way through the air; and for the purpose of yielding warmth to the body, a short soft down fills up all the vacant spaces between the shafts of the plumage. Their elevation from the earth is also aided by their bones being hollow, and consequently light; and that they may have every facility for rising, their heads are generally small, their necks long and flexible, and the body sharp on the under side, and flat or roundish on the back.

The wings again, by which they obtain a progressive motion are constructed for great expansion, in striking downward, while the moving mus-

cles are very large. Hence, for a bird to rise from the ground, it leaps, stretches its wings from the body, and strikes them downward so forcibly that they are put into an oblique direction, partly upward, and partly horizontally forward. This process is repeated, according to the pleasure of the bird, which can, without difficulty, rise or fall, retain its equipoise, or turn to the right or to the left.

The centre of gravity in birds being a little behind the wings, most of them, in flying, thrust out their head and neck. The heron, however, whose head and neck are long, always contract those members in flight, or they would overbalance the rest of the body, while the long legs are extended to maintain an equipoise.

Another instance of the wonderful economy of nature, is obvious in that wise provision to preserve the feathers of birds from violent attrition against the air, or injury from the moisture of the atmosphere; by being furnished with two glands behind, containing oil, which they occasionally press out with their bills, and spread over such parts of their plumage as require smoothing. Poultry, however, living mostly under cover, and seldom expanding their wings in flight, have less of this fluid than those which frequent the open air. The hen's feathers, for instance, are pervious to every shower, but those of a swan, goose, duck, or other aquatic fowl, are dressed with oil from the first day they leave the shell; and thence their flesh sometimes contracts a very rank flavor.

All the senses of birds, except that of tasting, seem very acute. The sight and smell are particularly exquisite; and the eye for protection from external injury has a winking membrane, which can at pleasure be drawn over the whole organ of sight.

No part of the globe is destitute of this elegant addition to its scenery; birds are found of some tribe or other, adapted to every climate. Some species, indeed, are confined to particular countries; others are widely diffused; and, at particular seasons of the year, either from a defect of food, or the want of a secure and suitable asylum for their young, many migrate annually in large companies, following some chosen leader during the day, and making a continual cry in the night, that they may not divide.

Of such migratory birds as may be considered indigenous, the most remarkable are the swallow tribe, cuckoo, nightingale, quail, woodcock, snipe, and crow. The retreat of some of these has been well ascertained; but the observations of nearly two thousand years have not removed the veil of mystery from this part of the natural history of others.

Though the notes of each species of birds are nearly uniform, experiments show them to be less innate than acquired. A common sparrow, taken very young from the nest, and placed near a linnet and goldfinch, adopted a song, a mixture of the notes of both its instructors. Three nestling linnets, educated, one under a sky-lark, another under a wood-lark, and a third under a tit-lark, forgot the song peculiar to their own species, and each adhered entirely to that of its tutor. The music which fills the groves during spring, generally proceeds from the tuneful throats of the males, and is expressive of love and endearment to their mates. It however, almost ceases about the end of June, though some resume their song in autumn, and a few cheer the gloomy hours of winter with their melody.

All birds are oviparous, or produce eggs; after a certain period of incubation, their young are extruded. These eggs differ in their kinds, in number, figure, and color. They contain the rudiments of the future animal, for whose maturation and perfecting by incubation a bubble of air is always at the large end, between the shell and the inside skin. The warmth com-

municated to this confined air by the sitting bird, gives its spring a ordinary increase, and at the same time puts its parts into motion. to the substance of the egg, are communicated pressure and motion in some unknown manner, gradually promote the formation of the till the time of its exclusion.

The use of that part of the egg called the treadle, is not only t the different liquids in their proper places, but also to keep the sa of the yolk in one uniform position, however the egg be turned. T ciple of its action may be thus explained: the treadle is specificall than the white in which it swims; and being connected to the me of the yolk, at a point rather out of the direction of its axis, causes to be heavier than the other. The yolk being thus made buoyan white is, by its own heavy side, kept with the same part always up

The nests of birds mostly are constructed with abundant art and tion; and in this important concern, both male and female assist brings a share of materials to the place—coarser substance to f foundation and exterior, and then wool, hair, or the down of an plants, to form a soft and commodious bed for the eggs and future In short, the act of nidification is one of those surprising natural ances which evinces the plastic hand of a creating and superintendi er to no common degree.

Of all birds, the Baltimore oriole exhibits perhaps as much in making its nest as any other. Wilson states: "Almost the whole g orioles belong to America, and, with a few exceptions, build pensile nests. Few of them, however, equal the Baltimore in the construction of these receptacles for their young, and in giving them, in such a superior degree, convenience, warmth, and security. For these purposes he generally fixes on the high bending extremities of the branches, fastening strong strings of hemp or flax round two forked twigs corresponding to the intended width of the nest; with the same materials, mixed with quantities of loose tow, he interweaves or fabricates a strong, firm kind of cloth, not unlike the substance of a hat in its raw state, forming it into a pouch of six or seven inches in depth, lining it substantially with various soft substances, terwoven with the outward netting, and, lastly finishes with a layer hair, the whole being shaded from the sun and rain by a natural p or canopy of leaves."

Baltimore Starling, and Nest.

One of the prettiest woven nests is figured and described by V his splendid work on African birds, though he is doubtful what sp bird was the mechanic. The following is his account of this beaut

"It is, I believe," says he, "the nest of the tchitrec; for thoug

never captured the bird of this species on the nest, and am not therefore certain of the fact, my good Klaas, a faithful if not a profound observer, assured me that it was. In one of our journeys through a wood of mimosas, in the country of the Caffres, he discovered and brought me this nest, having seen, he said, and particularly observed, a male and female tchitrec occupied in constructing it. It is remarkable for its peculiar form, bearing a strong resemblance to a small horn, suspended, with the point downward between two branches. Its greatest diameter was two inches and a half, and gradually diminishing toward the base. It would be difficult to explain the principle upon which such a nest had been built, particularly as three fourths of it appeared to be entirely useless and idly made; for the part which was to contain the eggs, and which was alone indispensable, was not more than three inches from the surface. All the rest of this edifice, which was a tissue closely and laboriously woven of slender threads taken from the bark of certain shrubs, seemed to be totally useless. The interior of the nest was not furnished with any sort of soft material, such as down, wool, or hair, but as the female had not laid her eggs when Klaas brought it to me, it is probable that the nest was not quite finished; a fact indeed proved by the birds being still at work at the time."

Nest of the Tchitrec.

It will be seen from our cut that the tailor-bird makes a nest of a similar character.

Nest of the Tailor bird.

These birds are so particularly fond of frequenting orchards, that scarcely one orchard is without them. They usually suspend their nests from the twigs of the apple-tree, and often from the extremities of the outward branches. It is formed exteriorly of a particular species of long, tough, and flexible grass, knit or sewed through and through in a thousand directions, as if actually done with a needle. The inside is usually composed of wool, or the light downy appendages attached to the seeds of the buttonwood, which form a very soft and commodious bed. Here and there the outward work is extended to an adjoining twig, round which it is strongly twisted, to give more stability to the whole, and prevent it from being overset by the wind. This nest is hemispherical, three inches deep by four in breadth; the concavity scarcely two inches deep by two in diameter.

The nest of the pinc-pinc, is usually placed among prickly shrubs, particularly the mimosas, but sometimes on the extreme branches of trees. It is commonly large, though some are larger than others; but the difference is only in the external appearance; in the interior they are almost of the same dimensions, namely, from three to four inches in diameter, while the circumference of the exterior is often more than a foot. As the nest is wholly composed of the down of plants, it is either of a snowy whiteness or of a brownish color, according to the quality of the down which is produced by the neighboring shrubs. On the outside it appears to be constructed in an irregular and clumsy manner, according to the situation of the branches upon which it is built, and to which it is so firmly attached, part of them passing through its texture, that it is impossible to remove it without leaving one half behind. The nest in question is entirely of a round form, having a narrow neck made in its upper part, by which means the bird glides into the interior of its home. At the base of this corridor there is a niche that has the appearance of a small nest resting against the large one, and it is generally supposed that this niche was made expressly for the male to sit upon, in order to keep watch while the female is hatching her eggs.

Nest of the Pinc-Pinc.

Nest of the Capocier

The interior of the nest of the Capocier is so neatly felted together, that it might be taken for a piece of fine cloth, a little worn, the tissue being so compact and close that it would be impossible to detach a particle of the materials without tearing the texture to pieces.

But, however astonishing instinct is, it can not be put in competition with reason. The reasoning powers ever aim at perfection, by opening new avenues of knowledge, while instinct is fixed, and neither advances nor recedes. Birds of the same species build their nests now, as they did a thousand years ago; from experience they gain little or nothing, instinct alone being their guide; whereas reason makes experiment the foundation of its deliberations, when anything new is to be attempted; and therefore is perpetually adding something to the collective stores of wisdom.

The grand natural divisions of birds are into land and water birds, each of which has been subdivided into several orders, or families. We shall merely describe a few of each.

The FLAMINGO, although one of the most remarkable of the aquatic tribe for its size and appearance, is by no means well known as regards its habits and manners. This bird, with a smaller body than the stork, has the neck and legs much longer, and indeed there is no other bird in which they are so disproportionately long. Its length, from the point of the bill to the end of the tail, is usually about four feet and two or three inches; but, to the end of the claws, it measures sometimes more than six feet; and, in general, the bird may be described as standing about five feet high. The head is small and round, and furnished with a bill nearly seven inches long, which is higher than it is wide, light and hollow, and suddenly curved downward from the middle. The nostrils are linear, and placed in a blackish membrane. The end of the bill, as far as the bend, is black; thence to the base, reddish yellow; and round the base, quite to the eye, covered with a flesh-colored membrane. The neck, as appears in the engraving, is slender and of a great length; the tongue is large and fleshy, filling the cavity of the bill—furnished with twelve or more hooked papillæ on each side, turned backward; the tip is of a cartilaginous substance. The bird, when in full plumage, is wholly of a deep scarlet (which is said to be the deepest in those of Africa), with the exception of the quills, which are black. From the base of the thigh to the claws is thirty-two inches, of which the feathered part takes up no more than three inches, the bare part above the knee thirteen inches, and thence to the claws sixteen: the color of the bare parts is red, and the toes are furnished with a web, as in the duck genus. The long, slender, and delicate legs are described as not being straight, but slightly bent, the shin rather projecting.

The young, which never exceed three in number, differ greatly from the adults, and undergo many changes of appearance. They do not gain their full plumage until the third year. In the first they are, for the most part, of a grayish-white color; in the second they are of a clearer white, tinged with red, or rather rose-color, but the wings and the scapulars are red; and in the third year a general glowing scarlet manifests itself throughout. The bill and legs also keep pace with the gradations of color in the plumage, changing gradually as the bird approaches an adult state.

The flamingoes seem to prefer a warm latitude, and are accordingly found in most of the warmer countries of the globe within forty degrees on each side of the equator, occasionally visiting, in summer, the more temperate regions. They live and migrate in large flocks, frequenting desert coasts and salt marshes. They are extremely shy and watchful. When feeding, they keep together, drawn up artificially in lines which, at a distance, resemble those of an army; and, like many other gregarious birds, they employ some to act as sentinels for the security of the rest. These sentinels notify the approach of danger by a loud noise like that of a trumpet, which may be heard to a great distance, and is the signal for the flock to take wing.

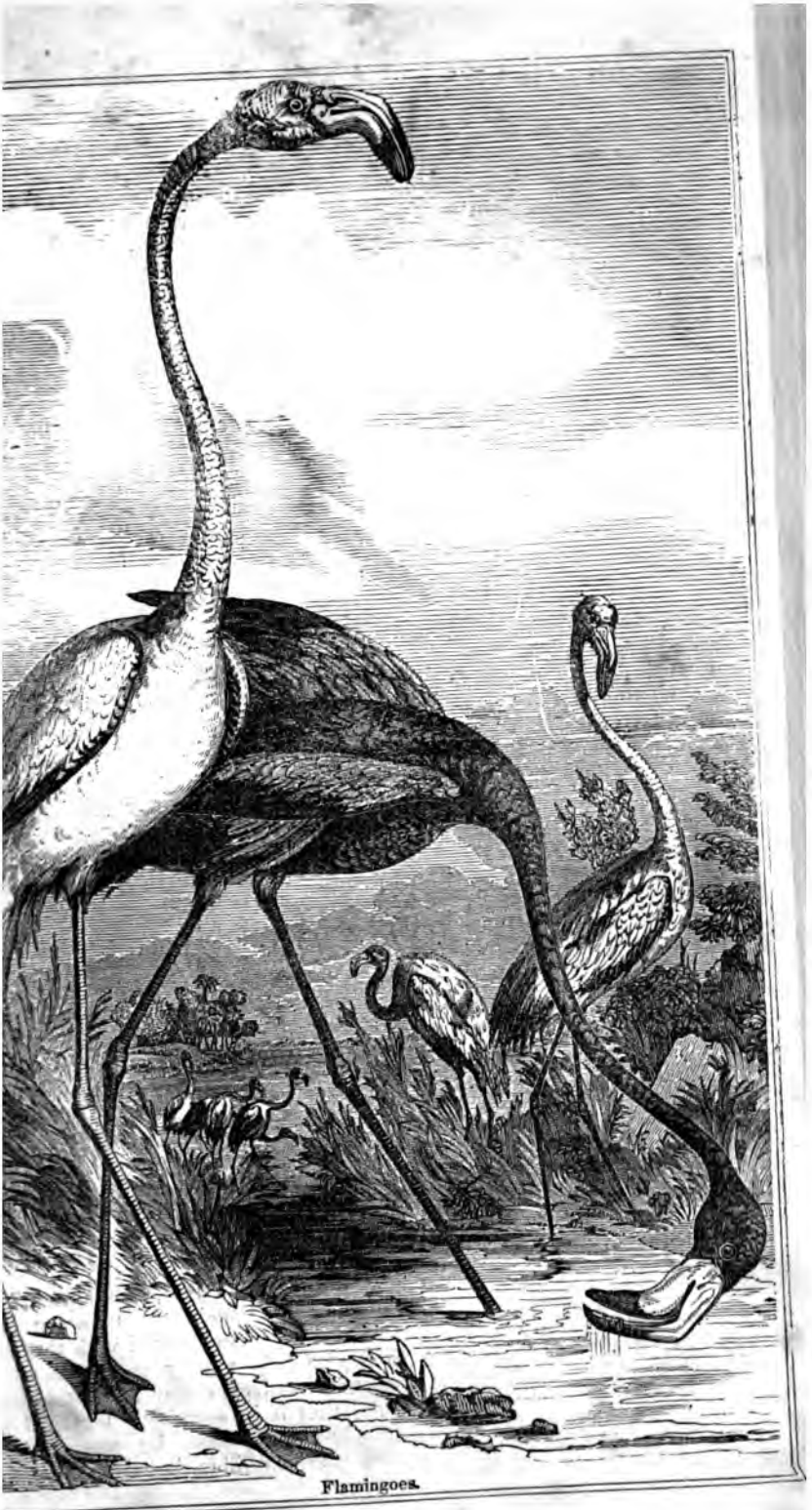
When flying they form a triangle. The food of the flamingo appears to consist of molluscæ, spawn, and insects, which they are represented to fish up by turning their heads in such a manner as to take advantage of the crook in their beak. When at rest, the bird stands on one leg, the other being drawn up close to the body, with the head placed under the wing on that side of the body it stands on.

The resemblance of a flock of flamingoes while feeding to a line of soldiers has often been noticed; and an instance is mentioned in the "Library of Entertaining Knowledge" where they were seriously mistaken for such. "During the French revolutionary war, when the English were expected to make a descent upon St. Domingo, a negro having perceived at the distance of some miles, in the direction of the sea, a long file of flamingoes, ranked up and preening their wings, forthwith magnified them into an army of English soldiers; their long necks were mistaken for shouldered muskets, and their scarlet plumage had suggested the idea of a military costume. The poor fellow accordingly started off to Gonaïves, running through the streets and vociferating that the English were come. Upon this alarm, the commandant of the garrison instantly sounded the tocsin, doubled the guards, and sent out a body of men to reconnoitre the invaders; but he soon found, by means of his glass, that it was only a troop of red flamingoes, and the corps of observation marched back to the garrison, rejoicing at their bloodless expedition."

The great length of the legs of the flamingoes obviously unfits them for sitting or squatting upon a flat or low nest, as is the practice of the families allied to them; and hence, according to Linnæus, they select for their nests some projecting shelf of a rock, upon which they can sit astride, like a man on horseback, without bending their legs. Without discrediting this account, we subjoin that which Dampier gives of the flamingoes observed by him at Rio de la Hacha, at an island opposite Curaçoa, and at the isle of Sal: "They make their nests," he says, "in the marshes, where they find plenty of slime, which they heap with their claws, and form hillocks resembling little islets, and which appear a foot and a half above the water. They make the base broad, and taper the structure gradually to the top, where they leave a small hollow to receive their eggs. When they lay a hatch they stand erect, not on the top, but very near it, their feet on the ground and in the water, leaning themselves against the hillock, and covering the nest with their tail. Their eggs are very long; and, as they make their nests on the ground, they could not, without injuring their eggs or their young, have their legs in the nest, nor sit, nor support the whole body, but for this wonderful instinct which nature has given them."

A similar account is furnished by Catesby, who compares the flamingo sitting across its nest to a man on a desk-stool with his legs hanging down. Labat, who found these birds breeding in multitudes on the coasts of Cuba and of the Bahama islands—on the deluged shores and low islets—says: "I was shown a great number of these nests; they resembled truncated cones composed of fat earth, about eighteen or twenty inches high, and as much in diameter at the base. They are always in the water; that is, in meres or marshes. Their cones are solid to the height of the water, and then hollow like a pot; in this they lay two eggs, which they hatch by resting on them and covering the hole with their tail. I broke some, but found neither feathers nor herbs, nor anything that might receive the eggs: the bottom is somewhat concave, and the sides are very even.

In some parts these birds are tamed, principally for the sake of their skins, which are covered with a very fine down, and applicable to all pur



Flamingoes.

poses for which those of the swan are employed. When taken young they soon become familiar; but they are very impatient of cold, and seldom live long, gradually losing their color, flesh, and appetite; and dying probably from the want of that food with which, in their natural state, they are abundantly supplied. They are caught by snares, or by making use of tame flamingoes. The method is to drive the latter into the places frequented by the wild birds, and to lay meat for them there. No sooner do the wild flamingoes see the others devouring this food, than they flock around to obtain a share. A battle ensues between the parties, when the bird-catchers, who are concealed close by, take the opportunity to spring up and seize their prey.

Of the tribe of waders, there is one which, from its extraordinary size, shape, and appearance, deserves to be particularly noticed. It is called the GIGANTIC CRANE (*Ardea argila*), a native of the East Indies, and was the first of birds to meet the eye of Bishop Heber, on his landing in India. "In the morning, as the day broke," says he, "we were much struck by the singular spectacle before us. Besides the usual apparatus of a place of arms, the walks, roofs, and ramparts of the fort, swarmed with gigantic birds, the hurgila, larger than the largest turkey, and twice as tall as the heron, which, in some respects, they much resemble, except that they have a large blue and red pouch under the lower bill, in which, we were told, they keep such food as they can not eat at the moment. These birds share with the jackalls, who enter the fort through the drains, the post of scavenger; but, unlike them, instead of shunning mankind day and night, they lounge about with perfect fearlessness all day long, and almost jostled us from our path." The Bishop's information, however, respecting this pouch, is not correct, it having been ascertained that this bag is not at all connected with the gullet, and has, therefore, no reference to food, but is merely an air-vessel on a very large scale, employed as occasion requires, either in sustaining the bird in its lofty soaring flights, or assisting it in searching for food in its original dwelling-places, among marshes and lakes. Its natural food in these situations consisting of reptiles and amphibia, it must often find it

The Gigantic Crane.

ıry to go beyond the depth of even its long legs, while from the re of its limbs in can not swim, and it is evident that its ponderous rd beak would prove an additional incumbrance. To overcome these ties, the bag, when filled with air, may be of great service, by coun- ıg the weight of this enormous bill, and thus enabling it to procure deep water. And this view of the subject seems to be confirmed by imony of an experienced witness, by whom a hurgila was seen wading ·ge piece of water, and proceeding to a distance from the shore, which ıerward found to be beyond its depth. The conclusion, therefore, ıat by filling this pouch with air, it was enabled to support itself. 's further use may be to supply it with air in its soaring flights, there o good grounds for supposing. When the dense vapors of the rainy ı are dispersed, and the sun has again burst forth with undiminished on the Indian plains, the hurgilas are observed to avoid the sultry f the lower regions, by taking refuge in the higher, rising gradually y appear mere specks in the firmament, or entirely lost to the sight. In : months, when not a cloud obscures the vault of heaven, hundreds of gigantic birds may be seen performing their graceful evolutions, and ıg majestically at a vast height—enabled to remain in so thin an ›here, most probably, by the supply of air collected in this bag.

s appetite the hurgila is as great a glutton as the heron. Nothing amiss to its all-digesting stomach. A leg of mutton and a litter of ttens swallowed whole, prove equally acceptable, with the additional of earth, bones, and hair, picked up between times.

The Adjutant.

Common Cranes.—The body of this species of crane is generally of an ashen gray color, with the throat, the forepart of the neck, and the hind head dusky; the crest or cap on the head, and also the quills black. The bird is about the size of a turkey in the body, and weighs about ten pounds, but, from the great length of its legs, it is nearly five feet in height.

The Common Crane.

Common cranes are very discursive birds, and range seasonally from the north of Europe to the south of Asia and the north of Africa, and in the latter country they are said to extend their migrations as far as the cape of Good Hope. On these excursions they fly high in the air, though they experience some difficulty in getting on the wing from the ground. Before taking their spring they run some paces, raise themselves a little at first, and then unfold a powerful and rapid wing. In the air they form very nearly an isosceles triangle, possibly for the purpose of cutting the element with greater facility. When attacked by an eagle, or the wind is likely to break their order, they close in circles. Their passage frequently takes place during the night, which is known by their sonorous voice, which announces it, and the head of the troop often utters, to indicate the route he is taking, a cry of appeal, to which all his followers answer. Their voices, even on these nocturnal voyages, are exceedingly loud, probably owing to the length of the windpipe, and the convolution near its bronchial extremity. When they cry during the

ıre generally understood to forbode rain, as is the case with the
ımy other birds which feed partially on those worms which the ap-
humidity brings to the surface, not only when the rain actually falls,
from the changed state of the air, the evaporation is much dimin-
hen they are peculiarly noisy and tumultuous, and fly near the
casionally alighting, it is considered as a pretty certain indication
st. On the other hand, when they rise high, and fly on in regular
regarded as a sign of fine weather.

ıg on the wing, the apparent difficulty which they experience does
:om the want of space in which to move their wings, for their legs
:ntly long for allowing these to act with perfect freedom, even when
e firmly on the ground. They appear to run forward for the pur-
:tting an impetus of the whole body; and when that is acquired,
hemselves into the air by the elasticity of the legs, and move off
ɔd style, and they are capable of passing over many miles without
When they assemble on the ground for the purpose of repose,
:r a long flight, they take with the head under the wing, they have
tinels appointed to give the alarm in case of danger. These sen-
l on the one leg, as is also the habit of the storks, and this resting
t is probably a greater relief than resting on both feet, because the
then preserved by means of the ligaments which act by their elas-
atter, and not by living exertion, as is the case with muscles. The
emity of the femur, or thigh-bone, where it articulates with the
he leg, has a hollow or depression, which, in ordinary cases, re-
ojection of the leg-bones, and when this projection is received in-
ɔw, the bones, taken together, are shorter than when it is displaced.
vever, this joint, which is the proper knee-joint of the bird, though
oint is usually so called, is much bent, the projection slides out of
, and bears upon a more elevated part; by this means the two bones
ɔcome longer, which lightens the ligaments, and the resistance of
ty of these, makes the leg much firmer at this joint than if it were
and, consequently, the one leg, bent as far as it will bend at this
s a very steady support. Many birds have this structure, and are
: on one leg for a considerable time, but none have it in such per-
he cranes and storks.

ımon cranes are understood to build in the northernmost parts of
, and probably as far to the north as Lapland in some instances.

: very common in Sweden, and particularly abundant in the marsh-
al and western Russia. In some parts of Poland they invade the
:cially those of buckwheat, in such numbers, that the farmers find it
:o employ people to drive them off. The nests are formed in
l tufts of tall aquatic plants, close by the margins of the waters.
ıre only two in number, of a greenish color, and blotched over with
:s.

ents were very familiar with the manners and migrations of these
mixed them up with their superstitions. The positions of the
both in Europe and in Asia, where they approximate the narrow
h connect the archipelago and the Black sea, naturally bring the
e migrant flocks over Greece; and the plains of Thessaly, and the
fertile parts, were, and are still, their resting-places, after cros-
ıe northern and the southern seas. In those days the flesh of the
ı luxury, and it is also recorded among the dishes served up in old
ıgland. In the old birds it is black and tough, but said to be at
ble in the young ones.

The Demoiselle, or Numidian Crane.

The elegant species to which the French academicians have given the name of demoiselle, is remarkable for the graceful symmetry of its form, the tasteful disposition of its plumage, and the agreeable contrast of its lighter and darker shades of color. In an upright position, it measures, when it is fully grown, about three feet six inches to the top of the head, and its length from the point of the bill to the tip of the tail, is about three feet. Of these measurements, the neck and legs form a very considerable part. A patch of light gray occupies the whole of the upper surface of the head, the sides of which, together with the neck, including, the long, slender, pointed feathers, which depend from its lower part over the breast, are of a uniform, but not very intense shade of black. Every part of the head and neck is fully plumed. Behind each eye there passes off, in a backward direction, a tuft of pure white feathers, three or four inches in length. These crests, as they are improperly termed, are extremely light and flexible, and have their barbs so loose as to float in graceful undulations on the slightest motion of the bird. The rest of the plumage, with the exceptions of the outer halves of the quill-feathers of the wings and tail, is of a uniform slaty-gray. The secondary quill-feathers are considerably longer than the primary, and when the wings are folded, form on either side of the body a tuft of dependent plumes, curving downward toward their extremities. All the quill-feathers have their outer halves of a dusky-black. The bill is yellowish or flesh-colored, the iris reddish-brown, and the legs and claws approaching to black.

Like most of the birds of the wading order, the Numidian crane is migratory in its habits, but it never reaches a high northern latitude, and the environs of Constantinople are the only part of Europe which it is said to visit. It is affirmed, but we know not on what authority, to have been observed as far east as Lake Baikal. The southern coast of the Black sea and the Caspian, seem, however, to be its proper Asiatic limits. In Africa, which is truly its native country, it extends along the whole of the Mediterranean and western coasts, from Egypt to Guinea, but is most abundant in the neighborhood of Tripoli, and throughout the tract of country which constituted the Numidia of the ancients. It arrives in Egypt in considerable numbers at the period of the inundation of the Nile, and makes its appearance about Constantinople in the month of October, being then probably on its passage from the Black sea toward the south. It is also stated to have been met with in the interior of south Africa, in the neighborhood of the cape.

Although, in common with the rest of its tribe, it prefers marshy situations, and feeds occasionally upon fishes, insects, and mollusca, a vegetable diet is more congenial to its structure and habits. Its stomach is a true muscular gizzard, like that of the common fowl, and, as in most granivorous birds,

ntains a quantity of gravel, evidently swallowed for the purpose of assist-
g in the trituration of the hard substances on which it generally subsists.
consequently prefers seed and other vegetable productions to every other
ıd of food. The convolutions of its trachea are less extensive than those
the common crane, and its note is therefore weaker and less sonorous, al-
ɔugh somewhat sharper.

Crowned Crane.—This autiful bird measures out four feet in height. ɜ plumage is of a bluish ıte color on the neck, and ı both surfaces of the ɔdy; the quill-feathers of ıe tail and the primaries f the wings are white. The fore part of the head ɜ covered by a close tuft ɔf short, smooth, even, velvety feathers, of a deep black; and behind these rises a very remarkable crest, consisting of a large number of flat, yellowish filaments, each twisted spirally on itself, fringed along its edges with a series of black-pointed hairs, and terminating in a blackish pencil. These filaments are of nearly uniform length, and measure four or five inches from base to tip. They take their origin from a roundish space on the back of the head, and expand equally at their extremities into a circle of considerably larger diameter than the head itself. The bill, legs, and feet, are of a dusky black; and the iris is remarkable for being almost destitute of color. As in most of the birds of this family, the feathers of the lower part of the neck are long, narrow, and gracefully dependent over the breast.

The Crowned Crane

The crowned crane is a native of Guinea and the neighboring countries; it is also found at Cape Verd. In a wild state it is natural to conclude that the crowned crane is a migratory species; but we know little of its habits except in captivity. Like the other cranes, it frequents swampy places, subsists partly upon fishes, worms, and insects, and partly on vegetable substances. At Cape Verd, we are told, it approaches so nearly to a state of domestication as to come of its own accord into the poultry yards, and feed with the tame birds confined in them. It perches in the open air to take its rest, and walks with a slow and somewhat stately gait; but, with its wings expanded and assisted by the wind, it scuds along with great rapidity. Its flight too is lofty, and capable of being continued for a very considerable time.

In captivity it is perfectly quiet and peaceable, readily becomes familiarized with man, and seems even solicitous for his company. When at rest it usually stands, like the other cranes, upon one leg, with its long neck bent ɔward, and its body supported in an almost horizontal position. But if disturbed in its repose, it lengthens out its neck, brings that, together with ɜ body, into an almost vertical line, and assumes a bold and imposing atti-

tude. Its proper note bears a considerable resemblance to that of the crane, and is compared by Buffon to the hoarse sound of a trumpet. It has also another note resembling the clucking of a hen, but louder and more disagreeable. Grain of all kinds, but particularly rice, forms its usual food in a state of captivity, and it is especially delighted by the occasional addition of a few living fishes.

Storks are regular birds of passage; but so punctual in their comings and goings, that from the most remote times, they have been considered as gifted with reasoning powers. The prophet Jeremiah, speaking of their knowledge, contrasts their instinctive obedience to their Creator's laws, with the culpable departure therefrom by those on whom God had bestowed the higher gifts of reason and understanding. "Yea, the stork in the heaven knoweth her appointed times; and the turtle and the crane, and the swallow, observe the time of their coming; but my people know not the judgment of the Lord."—Jer. viii. 7.

The Stork.

So punctual is the arrival and departure of the various migratory birds, that, to this day, the Persians, as well as ancient Arabs, often form their al-

manacs on their movements. Thus, the beginning of the singing of nightingales was the commencement of a festival, welcoming the return of warm weather: while the coming of the storks was the period of another, announcing their joy at the departure of winter. The expression, "the stork in the heaven," is more applicable than at first appears, for even when out of sight, its pathway may be traced by the loud and piercing cries peculiar to those of the old as well as of the new world. Its migrations are equally regular, there as with us, passing its immense periodical journeys at such a prodigious height as to be seldom observed. It is satisfactory thus to strengthen the authority of a scriptural passage from so distant a source, though amply borne out by witnesses in the very country in which the prophet dwelt.

"In the middle of April," says a traveller in the Holy land, "while our ship was riding at anchor under Mount Carmel, we saw three flights of these birds, each of which took up more than three hours in passing us, extending itself, at the same time, more than half a mile in breadth." They were then leaving Egypt, and steering for Palestine, toward the northeast, where it seems, from the account of another eyewitness, they abound in the month of May. "Returning from Cana to Nazareth," he observes, "I saw the fields so filled with flocks of storks, that they appeared quite white with them; and when they rose and hovered in the air, they seemed like clouds. The respect paid in former times to these birds is still shown; for the Turks, notwithstanding their recklessness in shedding human blood, have a more than ordinary regard for storks, looking upon them with an almost reverential affection."

In the neighborhood of Smyrna, and indeed throughout the whole of the Ottoman dominions, wherever the bird abides during its summer visits, it is welcomed. They call him their friend and their brother, the friend and brother exclusively of the Moslem race, entertaining a belief that wherever the influence of their religion prevailed, it would still bear them company; and it might seem that these sagacious birds are well aware of this predilection: for singularly enough, a recent traveller, who met with them in incredible numbers in Asia Minor, observed, that although they built on the mosques, minarets, and Turkish houses, their nests were never erected on a Christian roof. In the Turkish quarters they were met in all directions, strutting about most familiarly, mixing with the people in the streets, but rarely entering the parts of the town inhabited by the Greeks or Armenians, by whom, possibly, they may be occasionally disturbed. Nothing can be more interesting than the view of an assemblage of their nests. Divided as they always are into pairs, sometimes only the long elastic neck of one of them is to be seen peering from its cradle of nestlings, the mate standing by on one of his long slim legs, and watching with every sign of the closest affection. While other couples, on the adjacent walls, are fondly entwining their pliant necks, and mixing their long bills, the one sometimes bending her neck over her back, and burying her bill in the soft plumage, while her companion clacking his long beak with a peculiar sharp and monotonous sound, raises her head and embraces it with a quivering delight; while from the holes and crannies of the walls, below the storks' nests, thousands of little blue turtledoves flit in all directions, keeping up an incessant cooing by day and night.

At another Mohammedan town, Fez, on the coast of Barbary, there is a rich hospital, expressly built, and supported by large funds, for the sole purpose of assisting and nursing sick cranes and storks, and of burying them when dead! This respect arises from a strange belief, handed down from time immemorial, that the storks are human beings in that form, men from

some distant islands, who, at certain seasons of the year, assume the shape of these birds, that they may visit Barbary, and return at a fixed time to their own country, where they resume the human form. It has been conjectured that this tradition came originally from Egypt. By the Jews the stork was also respected, though for a different reason; they called it Chaseda—which in Hebrew, signifies piety or mercy—from the tenderness shown by the young to the older birds, who, when the latter were feeble or sick, would bring them food.

This affection, however, appears to be mutual, for the parent birds have a more than common degree of affection for their young, and have been known to perish rather than desert them. An attachment of this sort once occasioned the death of an old stork, at the burning of the city of Delft, in Holland. When the flames approached her nest, situated on a housetop, she exerted herself to the utmost to save her young; but finding every effort useless, she remained and perished with them. Besides the Jews, other ancient nations held these birds in veneration. A law among the Greeks, obliging children to support their parents, even received its name from a reference to these birds. By the Romans it was called the pious bird, and was also an emblem on the medals of such Roman princes as merited the title of *Pius*.

The FISH-HAWK is migratory, arriving on the coasts of New York and New Jersey, about the twenty-second of September. Heavy equinoctial storms may vary these periods of arrival and departure a few days, but long observation has ascertained that they are kept with remarkable regularity. On the arrival of these birds in the northern states, in March, they often find the bays and ponds frozen, and experience a difficulty in obtaining fish for several days. Yet there is no instance on record of their attacking birds, or inferior land-animals, with intent to feed on them; though their great strength of flight as well as of feet and claws, would seem to render this no difficult matter. But they no sooner arrive than they wage war on the bald eagles, as against a horde of robbers and banditti; sometimes succeeding, by force of numbers and perseverance, in driving them from their haunts, but seldom or never attacking them in single combat.

The Fish-Hawk.

The first appearance of the fish-hawk in spring, is welcomed by the fishermen as the happy signal of the approach of those vast shoals of herring, shad, &c., that regularly arrive on our coasts, and enter our rivers in such prodigious multitudes. Two of a trade, it is said, seldom agree; the adage, however, will not hold good in the present case, for such is the respect paid the fish-hawk, not only by this class of men, but generally by the whole neighborhood where it resides, that a person who should attempt to shoot

em, would stand a fair chance of being insulted. This prepossesvor of the fish-hawk is honorable to their feelings. They associate irst appearance, ideas of plenty, and all the gayety of business; it active and industrious like themselves; inoffensive to the producheir farms; building with confidence, and without the least dispoconcealment, in the middle of their fields, and along their fences; ning, year after year, regularly to its former abode.

st of the fish-hawk is usually built on the top of a dead or decay- sometimes not more than fifteen, often upward of fifty feet from id. It has been remarked by the people of the seacoasts, that the ving tree will die in a few years after being taken possession of by awk. This is attributed to the fish-oil, and to the excrements of but is more probably occasioned by the large heap of wet salt of which the nest is composed. The nests are constructed as Externally, large stick, from half an inch to an inch and a half in , and two or three feet in length, piled to the height of four or five from two to three feet in breadth; these are intermixed with corna-weed, pieces of wet turf in large quantities, mullein-stalks, and h dry sea-grass; the whole forming a mass very observable at half listance, and large enough to fill a cart, and form no inconsiderable a horse. These materials are so well put together, as often to adlarge fragments, after being blown down by the wind. About the lay, the female fish-hawk begins to lay her eggs, which are comree in number, sometimes only two, and rarely four. They are t larger than those of the common hen, and nearly of the same The ground color varies, in different eggs, from a reddish cream to white, splashed and daubed all over with dark Spanish brown, as if art. During the time the female is sitting, the male frequently her with fish; though she occasionally takes a short circuit to sea ut quickly returns again. The attention of the male on such occaregulated by the circumstances of the case. A pair of these birds uth side of Great Egg Harbor river, and near its mouth, were noted al years. The female, having but one leg, was regularly furnished, ting, with fish in such abundance, that she seldom left the nest, and seek for food. This kindness was continued both before and after n. Some animals who claim the name and rationality of man, ush at the recital of this fact.

PARROW-HAWK flies rather irregularly, occasionally suspending itself , hovering over a particular spot for a minute or two, and then off in another direction. It perches on the top of a dead tree or the middle of a field or meadow, and, as it alights, shuts its long suddenly, that they seem instantly to disappear. It sits here in an erpendicular position, sometimes for an hour at a time, frequently ts tail, and reconnoitring the ground below, in every direction, for ards, &c. It approaches the farmhouse, particularly in the mornking about the farmyard for mice or young chickens. It frequently nto a thicket after small birds, as if at random, but always with a r, and generally with a fatal, aim. "One day," says Wilson, "I a bird of this species perched on the highest top of a large poplar irts of the wood, and was in the act of raising the gun to my eye, swept down with the rapidity of an arrow into a thicket of briers rty yards off, where I shot him dead, and, on coming up, found a d-sparrow quivering in his grasp. Both our aims had been taken me instant, and, unfortunately for him, both were fatal." It is par-

ticularly fond of watching along hedge-rows and in orchards, where small birds usualy resort. When grasshoppers are plenty, they form a considerable part of its food. Wilson gives a very characteristic instance of the delicacy of taste of this falcon in respect to its food: "Though small snakes, mice, lizards, &c.," says he, "be favorite morsels with this active bird, yet we are not to suppose it altogether destitute of delicacy in feeding. It will seldom or never eat of anything that it has not itself killed, and even that, if not (as epicures would term it) *in good eating order*, is sometime rejected. A very respectable friend, through the medium of Mr. Bartram, informs me, that one morning he observed one of the hawks dart down on the ground and seize a mouse, which he instantly carried to a fence-post, where, after examining it for some time, he left it, and, a little while after, pounced upon another mouse, which he instantly carried off to his nest, in the hollow of a tree hard by. The gentleman, anxious to know why the hawk had rejected the first mouse, went up to it, and found it to be almost covered with lice, and greatly emaciated! Here was not only delicacy of taste, but sound and prudent reasoning. If I carry this to my nest, thought he, it will fill it with vermin, and hardly be worth eating. The blue-jays have a particular antipathy to this bird, and frequently insult it by following and imitating its notes so exactly as to deceive even those well acquainted with both. In return for all this abuse, the hawk contents himself with now and then feasting on the plumpest of his persecutors, who are, therefore, in perpetual dread of him; and yet, through some strange infatuation, or from fear that, if they lose sight of him, he may attack them unawares, the sparrow-hawk no sooner appears than the alarm is given, and the whole force of jays follow."

The Sparrow-hawk.

This tendency, which small birds have, to crowd round and annoy their more powerful enemies, is a curious point in natural history, and one the *rationale* of which is not very easily understood; the more so, that it does not hold in the case of the very powerful birds of prey. Nobody, we presume, has seen a flock of birds, either great or small, following and annoying the golden eagle, the jerfalcon, or even the peregrine. It is true that these prey less frequently upon little birds than the smaller hawks, and therefore they do not stand so directly in the character of enemies; but still, as was observed by Wilson, and as reported by American naturalists generally, the ospreys crowd round and annoy the white-headed eagle. The grand object seems to be, so to distract the attention of the enemy, as that he shall not be able to single out any one individual as his victim, but wear himself out in a crowd, the members of which are all equally attractive. This point, if duly worked out, might help to explain the curious subject of *fascination*, which some animals appear to possess over their prey.

THE BITTERN.—This species is widely distributed, being found in Europe, Asia, and America; and this general distribution would of itself lead to the conclusion that the birds are capable of migratory flights. In every part of the world, however, they are rarely to be seen, though in all places where they breed they are pretty certain of being heard about the commencement of the breeding-time.

The Bittern.

The particular characters of this species, besides the dimensions as already stated, are: the bill, from the tip to the hollow of the gape, about four inches, or nearly so, in length (which, from its form and the firmness of its substance, makes it a very formidable weapon), and it is of a dark color for the greater part of its length, but greenish at the base of the lower mandible. The naked skin at the gape, and the naked parts of the legs, are nearly of the same color, but the legs have a very slight tinge of a reddish hue along with the green. The feathers on the forehead and crown are black, but the general color of the clothing feathers is yellow, with more or less of a reddish brown tinge, and very finely spotted and barred with black; and it is from the number and regularity of the spots that it gets the name of *stellaris*, or starred.

The greater coverts of the wings and the quills are more inclining to rust color, and more thickly and regularly barred with black than the general plumage of the body. The tail is very short, but the closed wings do not reach to the extremity of it. The toes and claws are long, and both rather slender, though the claws are sharp-pointed. The claw of the middle front toe is slightly toothed on its inner edge. These are the characters of the male. The female is smaller in size, and the colors of her plumage are not so bright.

The common bitterns feel the influence of the season rather early. The love-song of the male begins early in March, and sometimes even in February, but that depends on the season and the locality, and it is sometimes begun and continued for a few days, and then left off for a week or more, in consequence of that short supplemental winter, which is pretty regular as well as severe, in those wild places which bitterns frequent, and known by the name of the "lapwing storm," as these birds and it very frequently come about the same time. When this storm, which is never of long continuance, and is often unknown in the low and warm places, or is merely a bleak wind there when it is snow upon the bittern's habitation, is over, the harmony of the bittern begins anew.

It is hardly necessary to say, that the once popular notion, that this sound is produced by means of the bill thrust into the quagmire, and aided by the vibrations of that in the jarring sound, is without foundation. Of all imaginable places, a quagmire covered with rushes and other rough herbage, such as that which bitterns frequent, is the least sonorous, or capable of producing or aiding in the production of sound of any kind; and whatever the note of a bird may be, that note is never produced, or even much modified, by the bill, or the upper end of the trachea. The real organ of voice in birds is always at the bronchial end of that canal, and not at the larynx, or upper end, as in the mammalia. In consequence of this structure, the whole of the trachea is converted into a sort of wind instrument, by which the sound, of which the lower end is the more immediately, or originally producing organ, is modulated in the same manner as the voice of the mammalia is modulated by the palate, tongue, and mouth. Of course, the sound which birds emit, varies with the length and form of the trachea, and, just as is the case in the sound of artificial wind instruments, the sound, whatever may be its original quality, is rendered deep and hollow in proportion to the length and size of the trachea, whether the additional length be produced by convolutions of that organ, or by a greater length of the neck. When there is a shaking sound, there is of course a vibrating membrane in the original organ of voice; but whether that shall produce a sharp and clear trill, as in the warblers, or a grating and hollow sound, as in the bittern, depends partly upon the structure of the membrane, and partly upon that of the trachea.

When the male bittern has continued sufficiently long at the exercise of his music, such as it is, for "winning the favor of his dame" (for such is the object of his to us unseemly music), the two, in concert, set about preparing the nest—that is but a homely structure—a rude couch of withered grass or rushes, placed upon a hammock, where it is well concealed, or upon the short stump of an aquatic shrub, if there happens to be one in the nuptial demesne of the pair. It is never far from the water, because the birds do not range out of the humid places; but it is always above the rise of any ordinary flood which can take place during the time that it is in use, and it is always formed of dry materials. All nests, indeed, are so, though there has been mention made of some aquatic birds taking advantage of the fermentation of green or moist vegetables, and the heat thereby produced, to assist in the hatching of their eggs. But the action of water would, even in this way, destroy the

principle of life in the eggs, instead of maturing them; and therefore, even those eggs which are committed directly to the waters, are so defended by their peculiar tunics, that the water has no direct chymical action upon them. The eggs of the common bittern are generally four, though, as is said, they are sometimes five, and they are of a greenish brown color. The nest is, however, as rarely seen as the birds, because, though in the early part of the season the male is noisy enough in the air during the evening twilight, both birds are remarkably silent during the day, and they are always silent when they are at or near the nest.

The period required for rearing the young is little short of seven weeks, about twenty-four days of which are spent in the hatching of the eggs, and three weeks in feeding the young in the nest. The young differ much from those of the true grallidæ in the length of time which they require before they are able in any way to shift for themselves. The young of the true grallidæ, though covered with down and not feathers, when they come out of the shell, are very soon able to run, and in this respect they have some resemblance to the gallinidæ; but those of the bittern are callow and almost naked, and at the same time scraggy and skeleton-like in their form.

The common bitterns live at all times solitary, or at most in pairs, and never flock, or even congregate together in families; and as soon as the young are able to shift for themselves, they follow the habit of their parents, and are not seen together till they pair and have families. With the exception of the love-song, which is not long continued, the birds are quiet, and they are quite inoffensive, and never attack or annoy any creature save those small animals which constitute the greater part of their food. In their chosen habitations, there are, indeed, few animals with which they can quarrel, even were they so disposed; and, as we have already seen, it is not very safe, even for the birds of prey, to quarrel with them.

Nor are they powerful in defending themselves against birds of prey only, for they offer formidable resistance to dogs; and if the dog is not all the more stanch, he will hardly go in upon the bittern if he gets a thrust from the bill. Even the sportsman, when he only wings the bird, or lames it so that it can not escape in the ordinary way, but yet retains the greater part of its strength and spirit, must approach it with caution. It strikes so fiercely with the bill, that it can wound the leg through a thick boot; and if it can strike any part of the body which has not such a protection, the wound which it is capable of inflicting is very severe; and thus, while it never invades the haunts of man, man does not invade it in its haunts with impunity.

The Partridge.—The characters of this genus are, the bill short, stout, compressed, and naked at the base; the upper mandible arched, convex, and much curved toward the tip; the nostrils at the base of the bill lateral, and half covered by an arched membrane; the three front toes united by membranes as far as the first articulation; the tail, consisting of fourteen or eighteen feathers, is short, rounded at the extremity, and drooping downward; and the wings are also short, rounded, and hollow. Partridges are stationary in some countries, and shift their abodes with the seasons in others. They are very numerous in warm and temperate regions of the globe, living in pairs, and steady in their family attachments. The greatest number reside in the fields and in open tracts of country, with the exception of some, which prefer the outskirts of woods in the neighborhood of water. Their food consists of grain, seeds, bulbous plants, insects, and worms. They run more frequently than fly, get up from the ground with some difficulty, and make a whirring noise when on the wing. They have numerous broods generally; and the young, as soon as they are hatched, run about

—indeed, they may be often seen running with a portion of the shell adhering to their bodies. The species and varieties of partridges are very numerous, so that we can afford room to notice only a few of the leading ones.

The partridges of the eastern continent admit of subdivision into two sections—the *true partridges*, which have the bill and tail short, and no produced spurs on the tarsi; and the *francolins*, which have the bill and tail produced, and spurs on the tarsi. The former are strictly monogamous, and fight few battles of mere gallantry, though they fight stoutly for their pastures; but the second are very pugnacious in some of the species. As a whole race, they inhabit warmer latitudes than the true partridges. Besides these, there is a third division, the *colins*, or partridge of North America, which are perchers, having the bill short and stout, and some of them are migratory.

The male of the common partridge, when full grown and in good condition, weighs about fifteen or sixteen ounces, and the female about two ounces less; the length of the entire bird thirteen inches, breadth twenty; the eyes are hazel; the bill in the young is brown, in the old bluish white; the legs also are yellowish when young, and as they increase in age, turn to a dark bluish white. The age of partridges is discovered by the bill and legs; and another method is, from the appearance of the last feather of the wing, which is pointed after the first moult, but in the following year is quite round. The general color of the plumage is brown ash, elegantly mixed with black, and each feather is streaked down the middle with buff-color; the chin, cheeks, and forehead, are tawny, and palest in the females. Under each eye there is a spot, with small warty excrescences, and above and behind the eye, toward the ear, is a naked skin of a bright scarlet, which is not very conspicuous, except in old birds; the legs of the male are furnished with a blunt spur or knob behind, and the breast with a crescent of a deep chestnut color, which takes place the beginning of October; this mark the female wants, and her feathers are in general not so distinct and bright. It is said the partridge, if unmolested, lives from fifteen to seventeen years; others dispute this computation, and maintain that they live seven years, and give over laying in the sixth, and are at their full vigor when two years old. Partridges pair about the third week in February, and sometimes, after being paired, if the weather be extremely severe, they all gather together, and again form the covey. They begin to lay six weeks after being paired. According to Ray there are one third more male than female partridges hatched; and it is well known that the old cocks will drive the young cocks off the ground, and afterward frequently fight till they kill each other. In this respect partridges differ from pheasants; they will have a certain range to themselves, while pheasants will hatch and live quietly with their broods close together. When too many birds are left, these contentions are sure to happen; and the consequence is a scanty produce, for the female is so pursued, that she drops her eggs in various places, forming no nest, and perhaps never laying two eggs in the same spot. The amorous nature of partridges has given rise to very strange accounts; we are unprepared to controvert, and less inclined to investigate, this peculiar propensity ascribed to them. The female lays her eggs on the ground, scraping together a few bent and decayed leaves, which are strewed roughly in the hollow made by an ox or horse's foot. This nest is formed upon hedge-banks, in corn or grass, but more particularly in clover fields; and the number of eggs laid are from fifteen to twenty-five, of a greenish-gray color; the number of eggs is much reduced when the bird is either very young or very old, and also when the first eggs have been destroyed and a second hatch produced. There have, however, been instances of amazing fecundity in the partridge. On a farm

1. Clapperton's Francolin—*Francolinus Clappertoni*; 2. Rüppell's Francolin—*Francolinus Rüppellii*; 3. Erckel's Francolin—*Francolinus Erckelii*; 4. Common Partridge—*Perdix Cinerea*.

occupied by Mr. Pratt, near Ferling, England, in the year 1793, a partridge-nest was found in a fallow field with thirty-three eggs; twenty-three of the eggs were hatched, and the birds went off; four more had live birds in them: the number of the eggs was ascertained before hatching, to decide a bet laid by a person who refused to credit so unusual a production; the female covered all the eggs; seven of which, in the centre, were piled in a curious manner.

Upon Sion-hall farm, in Essex, belonging to Colonel Hawke, in 1788, the following extraordinary incident of a partridge depositing her eggs, was known to many persons: This bird chose the top of an oak pollard to make her nest; and this tree, too, had one end of the bars of a stile, where there was a foot-path, fastened into it; and by the passengers going over the stile, before she sat close, she was disturbed and first discovered. The farmer, whose name was Bell, laughed at the circumstance, as being the report of his workmen, saying that it was only a wood-pigeon they had mistaken for a partridge. But Master Bell, who had killed some hundreds of partridges, so positively affirmed his having beheld the bird upon the nest on the tree, and also, at another time, having told the eggs to the number of sixteen, that he was persuaded to ride to the spot where the partridge was seen sitting. In a few days she hatched the sixteen eggs, and her brood, scrambling down the short and rough boughs which grew out all around from the trunk of the tree, reached the ground in safety. The female sits three weeks, and during that period undergoes a considerable moult, for the feathers of the belly drop: the great hatch is about the first ten days in June; the earliest birds begin to fly toward the latter end of that month.

Partridges are not every year equally plentiful: in general, when the season is dry during May and June, the birds are numerous; on the contrary, heavy and frequent rains during the time of laying and incubation, may chill or drown the eggs. If the weather is wet when the young first leave the shell, the cold benumbs the little strength they then possess in their legs, and they die while the mother is leading them in search of food to sustain life. At this time too much drought is likewise unfavorable; the ground cracks from the heat, and into these crevices they fall and inevitably perish; and this latter spreads a more universal destruction than the former, especially in clayey lands. The old partridge has other dangers to encounter from weasels, stoats, &c., crows, magpies, curs, and shepherds' dogs; all of which suck the eggs, not to mention the shepherds and farmers themselves, who, in some countries, very *kindly* destroy them. It is not, under all these disadvantages, an unfair calculation to suppose that one half of the broods in any one year are never reared. When the eggs are destroyed in any of the above ways, the partridges frequently lay again, and the produce of these second hatchings constitute those small birds that are not perfectly feathered in the tail until the beginning of October, and always continue a puny, sickly race, that seldom outlive the rigors of the winter. The affection for its young which the partridge shows, is peculiarly strong and lively; by her mate she is greatly aided in the care of rearing them; together they lead them out, call, and point out to them their proper food, and assist them in finding it, by scratching the ground with their feet; they frequently sit close to each other, covering the young with their wings like the hen; in this situation they are not easily sprung, nor will the sportsman who is attentive to the preservation of his game, disturb a scene so interesting; but should the pointer come too near, or unfortunately run in upon them, there are few who are ignorant of the confusion which ensues. The male first gives the signal of alarm, by a peculiar distressful cry, throwing himself at the same

ment more immediately in the way of danger, in order to mislead the emy; he flies, or rather runs along the ground, hanging his wings, and hibiting every symptom of debility, whereby the dog is decoyed, by a too ger expectation of an easy prey, to run further from the covey. The fe-ale flies off in a contrary direction, and to a greater distance, but soon after cretly returning, she finds her scattered brood closely squatted among the ass; and, hastily collecting, she leads them from the danger, before the g has had time to return from his pursuit. Mr. Markwick says he has en, when a kite has been hovering over a covey of young partridges, the l birds fly up at the kite, screaming, and fighting with all their might to eserve their brood. It is no uncommon thing to introduce partridges' eggs ider the common hen; when she has set the regular time, if the young do t appear, the feathers are glued to the inner surface of the shell from be-g exposed to too great heat from the hen. To remedy this, dip the eggs e or six minutes in water, and the moisture will soak through the shell d loosen the feathers: and this kind of bathing may also, perhaps, refresh e young bird, and give it additional strength to break its prison. It is said at the partridge bred under a hen, retains through life the habit of calling hen it hears the clucking of hens. The first food for the young partridge ould be the eggs of the small ant; afterward fresh curds, mixed with let-ce, chickweed, or groundsel. It will be sometime before they can eat ain readily.

Even when fostered by hand, the partridge seldom forgets its wild origin, d, at its full growth, soon acquires a habit of estranging itself from the use, however intimately it may have been connected with the place and its habitants, in the early stages of its existence. This species of partridge very generally distributed over the eastern continent, most abundantly in e temperate regions, though it also occurs in high latitudes, and, seasona ly at least, in hot countries, such as Egypt and the coast of Barbary. In a ird which is so generally distributed, considerable varieties of color may e expected, and two of these varieties have sometimes been described as parate species: these are the Damascus partridge, which is only about alf the size of the common variety, pale-ash color above, variegated with lack and red, and yellowish white on the under side: and the bill partridge, hich is smaller than the common variety, and darker in the color. These nd some others can be regarded as little else than climatal varieties, and ere are instances also of albinoes, or specimens nearly or altogether white.

The Owl.—These birds are found in every country; and, though all of em are nocturnal, or rather crepuscular in their feeding, yet they are among e most laborious of birds; and the quantity of food which they consume in roportion to the weight of their bodies, is probably greater than that con-umed by any other bird. As is the case with the diurnal birds of prey, aking them in the order of their disposition to prey upon the living bodies f warm-blooded animals, so, in the owls, the headquarters may be said to e in northerly and cold climates. In tropical countries, indeed, there are lenty of owls, but they are not birds of so bold a character as the owls of e north, just as the vultures of the same countries are not so bold birds as e northern eagles.

There is a very singular adaptation of twilight and twilight bird in this eographical distribution of the owls, and, if properly followed out, it is one hich is calculated to throw no small light upon the mode in which all the arts of nature are fitted to each other. In the tropical country the twilight very short, nearly of the same length all the year round, and under the quator itself there is only about an hour and twelve minutes between sunset

Young birds, squirrels, rabbits, rats, mice, partridges, and different ki of small birds, are its principal prey; and in proof of its voracity in dev ing these, we may relate the following anecdote from Wilson: "A large one, wing-broken, while on a foraging excursion, was kept abo farmhouse for sometime, and at length disappeared for several days, no knew how. Almost every day after this, hens and chickens also disappea one by one, in an unaccountable manner, till, in eight or ten days, very were left remaining. The fox, the minx, and the weasel, were alterna the reputed authors of this mischief, until one morning the old lady her rising before day to bake, in passing toward the oven, surprised her prisoner, the owl, regaling himself on the body of a newly-killed hen! thief instantly made for his hole, under the house, whence the enraged tron soon dislodged him, with the brush-handle, and without mercy despa ed him. In this snug retreat were found the greater part of the feathers many large fragments of her whole family of chickens."

These birds are not migratory in the United States, but remain in country all the year round; and as there is a bird very much resembling in Mexico, which is also resident there, they have been described as two ferent species, and neither of them the same as the European one. one of the United States has the crest, and also the markings somewhat ferent from the European one, but it is very doubtful whether these di ences be anything more than climatal; and this is probably the real c of difference between those animals of the two continents, which resem each other in their general characters. The American one has the t longer and broader than the European; but as we are quite ignorant of use of those tufts in the economy of the birds, we have no clew whateve the climatal course by which their form or size may be modified.

The Spoonbill.—The beak of the spoonbill is proportionally somev longer even than that of the stork; it is perfectly straight, flattened both al and below, broad, flexible, and covered at its base with a membranous c Toward the extremity, it expands into an oval disk, of greater breadth t the remainder of the bill, and rounded at the point. The nostrils form narrow oval fissures within the cere at the base of the upper mandible, wl is slightly grooved on either side by a longitudinal furrow, and terminate a trifling hook. On the inside, the mandibles are channelled, the margin the channel being raised, and surmounted by a row of sharp projecting ticulations. In the adult bird, the cheeks are naked, and a tuft of long row feathers forms a crest on the back of the head. The tongue is exc ingly short, triangular, and pointed; the throat capable of being dilated a pouch; the legs long, and covered with large reticulated scales; the four in number, the three anterior united for a considerable distance b web which is continued, in the shape of a fringe, to their very extremi and the posterior resting upon the ground for nearly its whole length; claws short, narrow, slightly curved, and pointed; and the second quill-fe er the longest.

The white spoonbill is the only certain species of the group that inhal the old continent. In common with all the nearly-related birds, it is mig tory in its habits, quitting the north of Europe, and more particularly H land, which is its favorite summer resort, about November, and returni about April. In the winter it takes up its quarters in various parts of Afri extending southward, even to the cape of Good Hope. It is rarely met inland countries except on the banks of the larger rivers, but is by no mea uncommon during the season on the coasts of great extent of country wh it embraces in its visits. In England, it is now but an occasional visiter.

than that of the wild goose, its entire length, from the extremity : to the tip of the tail not exceeding two feet, six or eight inches. › bill alone measures six or seven inches, and its breadth, at the :, is not less than an inch and a half. The expanse of its wings is feet. The entire plumage is of a clear white, with the exception yellowish spot on the breast of the adult, extending upward on in the form of a narrow stripe, the two branches uniting on the e long narrow feathers which form the crest on the top of the head ılly backward.— low tinge distin- e circumference › and the throat, in visible at the ›f the bill, the re- f which is of a :, with a bluish e lateral grooves. of the legs and ectly black; and are of a bright l. The females r than the males, n no other exter- er. In the young, ›f the wing-feath- :k, the parts which t feathers are of a dirty white, and the crest and spot on the breast y wanting.

White Spoonbills.

onbills usually frequent wooded marshes near the mouths of riv- ıg in preference upon the taller trees, but, where these are wanting, their abode among the bushes or even among the reeds. The fe- hree or four whitish eggs. They associate together, but not in any le numbers, and feed upon the smaller fishes and their spawn, shell- ther aquatic or amphibious animals. The form and flexibility of ıre well adapted for burrowing in the mud after their prey; and es which are placed on the inside of their mandibles serve both to more slippery animals and to break down their shelly coverings. rnal conformation which is nearly in every respect similar to that ks, is admirably suited to this kind of food. They have no proper lower larynx being destitute of the muscles by which sounds are and their only means of vocal expression consists in the snapping andibles, which they clatter with much precipitation when under ce of anger or alarm. In captivity, they are perfectly tame, living vith other inhabitants of the farmyard, and rarely exhibiting any of wildness or desire of change. In common with the neighbor- › they feed on all kinds of garbage.

ARLET IBIS, in its adult plumage, is one of the most splendid among hen fully grown it measures from twenty to twenty-four inches in he color of its plumage is, as its name imports, entirely scarlet, xception of the quill-feathers of its wings, which are black. The ts of its cheeks, its bill, legs, and feet, are of a pale reddish-brown. e covered with large scales. When first hatched, the young are ıith a blackish down, which soon changes to an ash-color, and at omes nearly white. This change occurs about the period they be-

The Scarlet Ibis.

gin to fly; after the second moulting they assume a tinge of red, which gradually becomes deeper and more distinct, appearing first on the back, and then spreading over the sides and upper parts of the body. Its brilliancy increases as the bird advances in age.

This beautiful species is a native of the tropical regions of America, and frequents the seashores and mouths of the large rivers in large bands, feeding upon insects, shell-fish, and the smaller fish. It generally lies concealed during the heat of the day and in the night, and seeks its food only in the morning and evening. Its nest is built among the thickets, and is of the most simple construction. When taken young, it is easily tamed, and submits to domestication without repining. According to De Laet it has been propagated in captivity, and M. De la Borde gives the history of an individual which he kept for upward of two years, feeding it on bread, raw or cooked meat, and fish. It was fond of hunting in the ground for earth-worms, and followed in quest of this food the labors of the gardener. It would roost at night on the highest perch of the poultry-house, and fly abroad early in the morning, sometimes to a great distance from home. Our climate is probably too changeable and too cold for so delicate a bird, otherwise it would form a splendid, and it is said a savory, addition to our stock of domesticated fowls. They are frequent on the coast of Florida.

The Sacred Ibis.

HE BEARDED REED-BIRD.—This most elegant and truly beautiful bird n inhabitant of large reedy tracts in various situations, both in Europe Asia, being found in Sweden and other northern countries, and plenti- along the reedy borders of the Caspian sea; though nowhere in such ndance as in Holland. In England it inhabits the fenny districts of Nor- and Cambridgeshire, where it is not uncommon; and is found also in Essex marshes, and in those of Sussex, bordering on the sea; also in ucestershire, Lancashire, and Cornwall. It has likewise been seen near sley, in Scotland.

: is a small species; but from very great length and thick- of its plumage, and the th of its tail and legs, it ap- rs when alive almost as large a robin. The bill is small delicate, somewhat of the of the titmouse (*parus*), but h weaker, and more arcua- and the upper mandible is htly curved and pointed; of ch yellow cover inclining to ge, but fading almost imme- ely after death. Irides, fine ow; in the young of the , white, with a yellowish e. Between the bill and is a tuft of pendent pointed hers on each side, forming nd of mustaches; glossy jet k in the male, and of the e color with the surrounding nage in the other sex. The d, neck, and breast, of the

The Bearded Reed bird.

e, of a beautiful pure bluish gray; the latter softly tinted with purplish k; chin and throat very pale ash-gray, almost white; flanks yellowish wn; the back and tail a very rich yellowish brown, inclining to orange, ning a fine contrast with the gray neck; scapulars wood-brown; greater ls blackish gray, having their outer webs edged with white; secondaries ed with orange-brown; tail long, and very wedge-shaped, the exterior hers having their outer webs and tips pale reddish white, under tail- erts jet black, legs and toes black; in the female, the chin, breast, and s of the neck, are whitish, with a slight tinge of pink; crown of the d, wood-brown; the occiput sometimes spotted with black; back yel- ish brown, in some having a list of blackish spots down the middle; vent under tail-coverts pale yellowish, inclining to wood-brown. The young year resemble the adult female, excepting in the color of the iris, and aving a very broad black line along the back.

. correspondent of the Magazine of Natural History observes: "The rded titmouse (reed-bird) inhabits the marshes bordering the Thames, both Kent and Essex. I was told in December last that some had been seen large piece of reeds below Barking creek; and being desirous of ob- ing them in their haunts, I went out, accompanied by one person and a , to the abovenamed place, on a cold windy morning; the reed-cutters ng commenced their operations, I was fearful of deferring my visit, lest

my game might be driven away. Arrived on our ground, we traversed it some time without success, and were about to leave it, when our attention was aroused by the alarm-cry of this bird. Looking up, we saw eight or ten of these beautiful creatures on the wing, just topping the reeds over our heads, uttering in full chorus their forcibly-musical note, which resembles the monosyllable *ping, ping*, pronounced at first slow and single, then two or three times in a more hurried manner, uttered in a clear and ringing though soft tone, which well corresponds with the beauty and delicacy of this bird. Their flights were short and low, only sufficient to clear the reeds, on the seedy tops of which they alight to feed, hanging like most of their tribe (that is, like the various titmice), with the head or back downward. If disturbed, they descend by running, or rather by drooping. The movement is rapid along the stock to the bottom, where they creep and flit perfectly concealed by the closeness of the covert, which resembles the tint of their plumage. After some time we were fortunate enough to shoot one a male in fine plumage. I held it in my hand when scarcely dead. Nothing could exceed the beauty of the eye; the bright orange of the iris, surrounded by the deep glossy black of the mustaches and streak above receives additional brilliancy from the contrast, and struck me as a master piece of color and neatness."

The Chaja.—The chaja, or crested screamer, which is figured in our engraving, is destitute of the long slender horn on the head of the horned screamer, but has the back of the head ornamented with narrow dishevelled feathers, two inches and a half in length; the beginning of this plume is between the eye and the beak, so that the crest encircles the head like a diadem, and hangs down behind. The general clothing of the head and neck consists of down, with the exception of a naked band toward the lower part of the latter; this down is of a pale lead color, the naked collar is flesh color, and below it is a collar of black down; the general plumage is of a whitish gray, the wings and tail being blackish brown. Length of bird thirty-one inches.

The chaja lives singly or in pairs, but is sometimes seen in flocks; it frequents morasses, and the low marshy borders of rivers; it does not swim but wades in quest of aquatic and other plants, on which alone it feeds. Azara observes that he has seen chajas brought up from the nest in various houses in the country, and that they were as domesticated as the poultry. The same writer also informs us that the chaja perches on the tops of the loftiest trees; on the ground it walks with the body horizontal, the head and neck raised vertically, the beak being kept rather down. Its cry is loud and shrill, and is uttered not only during the day, but the night also; that of the male is represented by the word *chaja*, that of the female *chajali*, and they respond to each other's call. The wings are armed with double spurs which, with the diadem-like crest, the size, the stately air, and astounding cry of the bird, might lead to the idea of its being a bird of prey; whereas it is gentle and quiet. Its length of wing enables it to fly well, and it has an apparatus of extensive air-cells between the skin and the muscles of the body, which are even continued down the legs to the toes. Like the vulture it wheels around in vast circles, and often rises till out of sight.

August is the breeding season of this species; the female lays two eggs and the young, while yet covered with down, follow their parents in the same manner as do the young of the plover and lapwing. The nest is spacious, and is constructed of twigs and sticks, and placed, according to some on bushes and low trees surrounded by water; or, according to others among the reeds and tall herbage which grow in the midst of the morass.

The engraving on the previous page represents an adult chaja, a
ied by its young, just hatched, and still clad in down.

THE JACANA.—A very peculiar, and by no means uninterestin
of birds, belonging to Cuvier's long-tood family of *echassiers*, or st
and forming the most typical or characteristic genus of the family.
habits, they are somewhat allied to the rails and water-hens; but
all natives of warm countries, and possess the power of running ligh
aquatic plants and herbage, in far greater perfection than any other

The birds of this genus are very strikingly distinguished fron
other walking birds, by the great development of their feet, which
the species, and in every part of the structure, very large and s
proportion to the size of the bird.

The most remarkable part, however, is the great development of t
These toes are four in number, three to the front, and one to the
perfectly free, or without membranes, to their very basis. They
nished with long claws, very little bent, and tapering to points, w
exceedingly sharp; and this peculiarity of the claw is more remar
the hind toes than on any of the rest. From this produced form and
sharpness of the claws, the French have given these birds the fanci
of surgeons, though it does not appear that they exercise those keen
in any kind of phlebotomy, or in doing violence to any creature v
One of the most remarkable appendages of the wing is a large horny spur, slightly curved, and very sharp-pointed, which is placed on the turn of the wing, and which might be used as a rather formidable weapon; but whether it ever is so used, has not been determined. This formidable armature of the feet and the wings has, however, led some to conclude that these birds are of a pugnacious disposition: but the very reverse seems to be the case; for those who have had the best opportunities of observing them in a state of nature, represent them as being very peaceable birds,

Wing of the Jacana.

and very much attached to each other, especially the pairs, which
very strong reciprocal affection. The birds are at all times difficu
proach, because of the lightness and agility with which they run
floating leaves, and also through the tall aquatic grasses, and the e
which, when necessary, they can throw themselves so far into the
be able to get on the wing. The great elasticity of their toes, and t
contractions of these by the bendings of the upper joints of the li
the means by which this is effected. The keen points of the claws,
ble them to take hold of a stem or a leaf, so as to form a point of
with very little pressure. The spur on the wing is not of such
utility, but it may also assist the bird in holding on upon the aqua

Jacanas walking on Water-Plants.

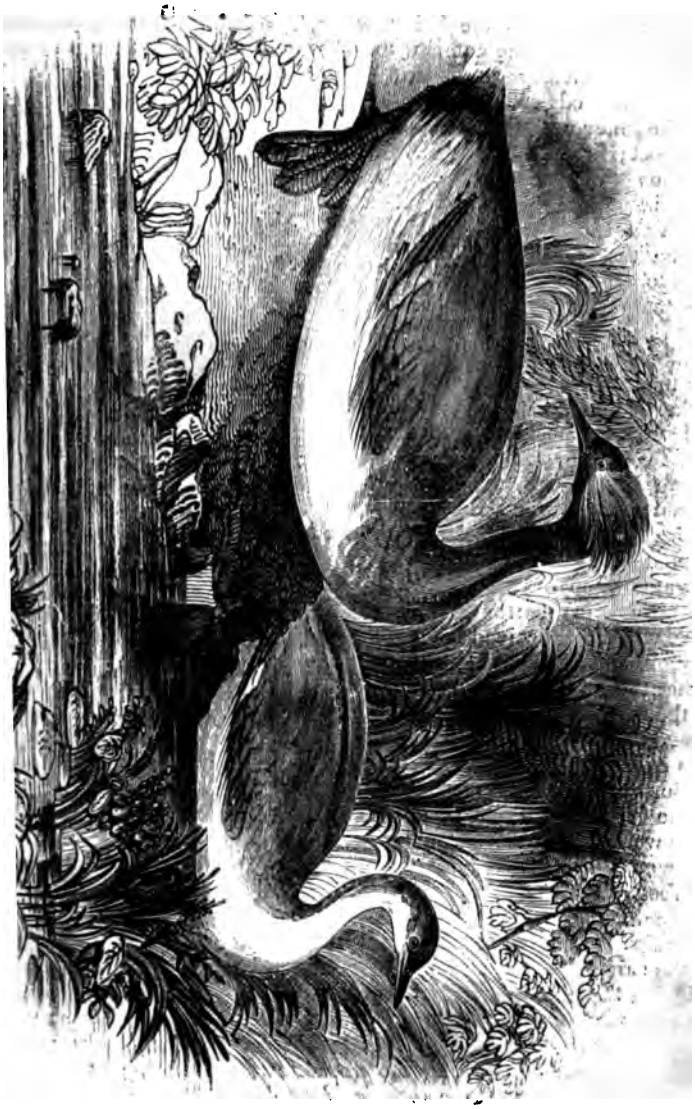
age, until it has acquired a footing. Any one who has observed with wl swiftness, neatness, and lightness, the common water-hen runs along a broc when there is only here and there a struggling leaf or stem to afford su port, can readily imagine how much more fleetly these birds, whose feet a so much better organized for such an office, can make their way over t waters; and, consequently, how difficult it must be to obtain a sight of thei more especially as the places which they inhabit are not the most tempti for human visiters.

When one is occupied, the other is always watching, and instantly giv the alarm-cry when danger is near; or if the alarm call is given, not fro the actual appearance of danger, but from the apprehension of it, the one called to respond that all is safe, by a sort of subdued and murmuring cı which has something very pleasant in it. During the day these birds rema very silent, unless when they are disturbed by unwelcome visiters; but d ring the night, when they are in motion, their cries are heard at a great d tance, and the sound is by no means agreeable. Their nests are formed the thick tufts of marsh plants, in a very similar manner to those of the lon toed birds of Europe. They are built of rushes and other coarse aqua plants, of which a great quantity is collected, and placed sufficiently high f being above any ordinary inundation. The hatch consists of four or fi eggs, of a greenish color, and mottled with small spots of dark brown.

The birds of this genus were once supposed to be natives of America onl but they are found in the marshy parts of all tropical countries. In Centı Africa, in India, in the Oriental isles, as well as all the richer parts of tro ical America. They are birds which are characteristic of the places whi they inhabit; and as they are rarely found in situations which are but occ sionally covered with water, and which form the proper pastures of tl cranes and storks, they are not much given to migration. Within the localities, their flight, when they do take the wing, is rapid; but they do n rise to great heights, or fly over long distances.

Their proper function in nature appears to be that of cleaning the leave of aquatic plants, of which there are vast numbers in tropical countries, fro insects and other small animals, which are not available either to flying o swimming birds. They take up the waters as to pasture, when the fly catchers, bee-eaters, and other birds, which can use the wing rapidly, then leave off; and they quit them at that particular stage where they becom the pastures of ducks and divers, and other birds which seek their food s the bottom, or submerge in the free waters.

The GREBES constitute a truly natural genus, distinguished by the title o *podiceps*, in allusion to the lobated form of their toes, a peculiarity which w shall describe more fully; they are birds of aquatic habits, and are especial ly celebrated for their powers of diving, and for the rapidity of their sub aquatic evolutions. They are not, however, like the penguin and the grea auk, destitute of the powers of flight, though they seldom have recourse to this mode of escape from pursuit; for the shortness of the wings, and the ab sence of a tail, render it impossible for them to rise with celerity: once, how ever, elevated, their flight is rapid, and capable of being well sustained Hence they take long migratory journeys with more ease than might at fir be expected. In the form of their body, the position and structure of th feet, and the nature of their plumage, the grebes are expressly fitted for th element on which they habitually reside, and in which they chase their fin prey with arrow-like velocity. The head is narrow; the beak long, pointe and sharp, somewhat compressed at the sides, and slightly inclined upwa toward the tip. The neck is long; the body boat-shaped and flattened; th



wings are short, concave, and pointed; there is no tail; the plumage is thick, full, and soft; a dense layer of fine down forms an under-dress, being covered by feathers of a silky gloss and texture, and completely waterproof. The toes differ from those of every other aquatic race of birds. Instead of being webbed, as in the duck tribes and others of the natatorial order, they are completely separate and flattened, having their edges furnished with a broad stiff membrane, each toe being, in fact, a distinct and beautifully-formed paddle. Of the three anterior toes, the outermost is the longest and largest; the next is nearly as large, and its outer edge lies tile-like over the inner membrane of the outermost; the innermost toe is less than the middle one, on which its outer edge impinges. The hind toe is short, placed high on the leg, and furnished with a lobated membrane. The arrangement of the scales covering the toes, gives to them a leaf-like appearance, for the lines dividing the scales run in regular succession obliquely upward from a central line or shaft, formed by the bones advancing to the tips, which are covered with a broad, flat nail. The leg, or tarsus, is short, and flattened laterally, so as to cut the water when drawn up after each stroke. A better idea of the exquisite mechanism of the foot of the grebe, will be conceived from the annexed sketch, than from any verbal description, and its tri-oared character at once understood.

Foot of the Male-Eared Grebe.

That the outer toe, or oar, should be the largest (contrary to what is usually the case), may at first appear surprising; on reflection, however, it will be seen to be a necessary provision, inasmuch as by this arrangement the impetus of each stroke of each foot is carried in a line obliquely forward to the anterior part of the chest, to which it converges; whereas, were the inner toe the largest, and the outer the smallest, the line of the impulse of each stroke would diverge from the body, and consequently there would be a waste of power. We find a beautiful analogous formation in this respect in the hind feet or paddles of the sea-otter of the west coast of North America (*enhydra marina*).

The situation of the legs in the grebe is thrown as far backward as possible, and the thigh is short, and as it were, retracted, so as not to advance beyond the body; the grebe, however, can not sit upright like the penguin, for it does not rest on its heel; it is not plantigrade. When resting on the land, it lies prone on its whole body, and in this situation shuffles along like a seal, pushing itself onward by striking the ground with its feet. Ill-adapted for the land, the grebe, as we have seen, is admirably constructed for the water. It swims low, owing to the flatness of its body, and when diving in pursuit of its prey uses its wings to add to its velocity. The employment of the wings in sub-aquatic progression, is not, however, peculiar to the grebes; in the great auk and penguin the wings are fashioned for this and no other use, and in all true diving birds, as the guillemot, razor-bill, &c., the wings serve

similar purpose, and they are short, stiff, and concave. The quickness with which the grebes dive is remarkable; so instantaneously do they plunge, that they are able to avoid the shot from a fowling-piece, fired by a common flint lock, and they will then make a stretch of two hundred yards before coming up to breathe, which is done by merely raising the head for a second above the water.

We are informed by Mr. Selby that when making a tour through Holland, in company with Sir W. Jardine, he gave chase to a crested grebe, upon one of the lakes in the neighborhood of Rotterdam, and that though in a boat conducted by those accustomed to the business, it cost upward of an hour and a half's severe exertion to get within range and secure it by a shot through the neck. The food of this singular group of birds consists of fishes and aquatic insects; but it is observed that the stomach is always found to contain a mass, greater or less, of the feathers of their own body. That these are swallowed to assist digestion, as has been suggested, is not clear; most probably they are involuntarily swallowed during the dressing and cleaning of the plumage, for we often find in the stomach of cows and other ruminants, balls of hair; the material being collected into the mouth while licking their own or each other's coats (which they may be often noticed doing), and then swallowed. Hawks and owls, which swallow the feathers of birds on which they have fed, cast up these indigestible exuviæ in the form of round pellets, but we have no grounds for supposing that this is the case with the grebes. Both Montague and Selby observe that the feathers which have been for some time, as they conjecture, in the stomach, are comminuted, and thus reduced to a state fit for passing into the intestinal canal.

The places chosen by the grebes for their nidification, are among the thick reeds and luxuriant aquatic herbage of marshes, or the sedges which border fresh water lakes and rivers, the nest being composed of a mass of half-decayed roots, dried flags, and other similar vegetable materials. It is large and compact, but roughly put together, and rises or falls according to the rise or fall of the water on which it floats; the eggs are three or four in number.

The females when they leave the nest in order to obtain food, cover the eggs with loose materials, apparently for the purpose of concealment; some writers, however, are disposed to regard this as an instinctive provision made by the bird for preserving the warmth of the eggs till her return. The common gallinule, or moor-hen, covers up her eggs in the same manner, and no doubt for the same purpose, namely that of concealment from natural enemies.

The Snow Bird.—When winter comes arrayed in garments of snow, the little snowbirds may be seen waving their wings against the sunlight, and looking like stars of silver. The scientific name of the bird is the snowbunting, it generally inhabits the higher regions of the arctic circles, but as the severe cold comes on, it migrates over the United States, and also Europe and Asia. Early in December, they descend into the northern states, in large flocks, either immediately before, or soon after a fall of snow. Amid the snow-drifts, flocks of these "bad-weather birds," as they are termed by the Swedes, flit about in restless and hungry troops, resting for a moment in the fences or trees, and then again on the wing. At times, pressed by hunger, they alight near the door of the farmhouse, or approach the barn, and in very severe weather, will even venture into the outhouses in search of seeds or crumbs: but when the weather becomes milder, they are much more shy. They seem to be aware also of the advantages to be derived by them from larger birds scratching the earth, and in some degree keep company with par-

tridges, wild turkeys, and even squirrels, in order to pick up the food rejected by these animals as beneath their notice. The snowbird is a true hopping bird, and makes its leaps without the least appearance of moving either feet or legs; in which circumstance it resembles the sparrow. Another of its habits is, that it resorts at night during severe cold weather, to stacks of corn and hay, in which they form a hole, and remain snug in it, during the continuance of such weather. At the period of incubation they are said to sing agreeably, but appear to seek out the most desolate regions of the cheerless north, to pour forth their melody to their listening mates. Their nests are built in the fissures of rocks or mountains; the inside of them is made of dry grass or feathers, and lined with the down of the arctic fox. The eggs are said to be five, which are whitish, spotted with brown and gray. The old bird measures about seven and a half inches in length.

Snowbirds.

THE APTERYX.—The engraving on the next page represents a curious bird, the apteryx or wingless bird of New Zealand. A most extraordinary species, genus, family, and—as one may almost say—order of winged creature, of which the characters, so far as they are known, clearly enough demonstrate that it is a bird, but they as clearly demonstrate that it does not come within any of the orders into which other birds are arranged in the systems. All that is known of it is a single skin, with the bill and feet attached, unmutilated, and in a good state of preservation. This skin was brought from New Zealand in 1812, by Captain Barcley of the ship Providence, from whom it passed into the hands of the late Dr. Shaw. Dr. Shaw described it in the twenty-fourth volume of the Naturalist's Miscellany, and accompanied the description by a figure; and that description and figure form the only sources whence Temminck, and some other foreign naturalists, who have noticed the bird obtained their information. But Dr. Shaw, though a laborious collector and voluminous compiler, was by no means a philosophic naturalist, and therefore his figure was not very accurate, and his description by no means calculated either to draw much attention to the bird, or to put inquirers in the right way of discovering its natural relations or affinities. Some foreign

aturalists went even so far as to question the existence of the bird, though the same work, and in the adjoining page, the very same author mentions under its New Zealand name of *kivi-kivi* (most likely an imitation of its y), as being abundant in the forests of that country. Of course, no charac- rs are described along with the mention of the kivi-kivi, because, though any of the voyagers frequenting New Zealand, have often heard the natives ention the name of the bird, the places where it is found, and some of them ave seen the chiefs with cloaks ornamented with the skins, so as to leave no oubt of the identity of the Stanley specimen, yet it does not appear that any ut the natives have seen either bill or foot except in that specimen.

Lord Stanley sent the specimen the zoological society, where the kin was so carefully examined as ascertain with certainty that there no deception in it; and a new fig- re and description, more in accor- ance with the analogies of the ird, were drawn up by Mr. Yar- l, with his usual accuracy. Of this gure, prepared under the direc- ons of Mr. Yarrel, we have given

The Apteryx.

a accurate view, and we can not convey a clearer idea of the appearance of is extraordinary creature than in that gentleman's words, which, on account f the variety of the subject, we will quote entire:—

"The whole length of the bird," says Mr. Yarrel, "from the point of the eak to the end of the body (for there is no tail), is thirty-two inches; the eak is of a light yellow-brown, long, slender, smooth, and polished, in form esembling that of an ibis, but rather more straight, and depressed at the ase; length from the gape to the point, six and three fourths inches; the up- er mandible is grooved in each outer side, near the margin, throughout its hole length; at the end of this groove, at each side, the nostrils are pierced, he apertures elongated and covered by a membrane, so suspended on the utside of each of these like a valve, that the slightest pressure against the uter surface when flexible, as during life, would render the nostrils imper- ious, and effectually defend and cover them. A bristle introduced into the ostril, under and behind this defending membrane, passes up the whole length of the beak. The upper mandible terminates in a blunt truncated knob, pro- jecting a little downward, behind which, on its under surface, the end of the lower mandible ranges when both are closed. The lower mandible is also grooved slightly near the outer edges throughout its whole length. Both man- dibles are broad and flat at the base, measuring full one inch across at the gape, and only seven lines in height. The breadth of the upper mandible at the point is two lines, under mandible still more narrow.

"Throughout the whole length of the upper mandible and the distal three fourths of the under one, the inner or opposed surfaces of both are perfectly flat, producing, when pressed together, uniform and entire contact, and well adapted for compressing or crushing such substances as may be selected for food. The proximal fourth of the lower mandible is concave on its inner surface, affording space for the tongue, which must, in proportion to the beak, be small and short.

"The form of the body in this preserved specimen is that of an elongated cone placed nearly upright over a pair of short and stout legs, and the bird s thus made to resemble a penguin. In the figure annexed to the present

description, the position and character assumed for it is that of the *struthious* birds, in accordance with its real systematic relations.

"From the crown of the head to the lower end of the body, the length is twenty-four inches; and the circumference at the lower part eighteen inches. The feathers on the top of the head and forehead are short, and the skin carried forward over the base of the beak to the extent of an inch, is covered by a mixture of dark feathers, bristles, and hair. About the gape on each side are also several long black bristles. The feathers of the neck are somewhat longer than those on the head, and they increase in length generally in proceeding downward over the body. Those of the head and neck are of a hair-brown color, with the shafts lighter; on the back, sides, and rump, the shafts and inner portions of the webs are reddish, yellow, brown, and the edges dark-brown, producing an agreeably variegated appearance. On the lower part of the neck in front, the breast, and the belly, the feathers are lighter in color than on any other part of the body; the shafts still lighter than the webs, and grayish white. The feathers generally are uniform in structure, and resemble those of the *emeu;* but each feather is much shorter, the longest (those hanging over the rudimentary wings) not exceeding four and a half inches. The webs are of greatest extent, most flocculent and silky at the base of each feather, and become more linear and shorter toward the end; the whole of the fibres forming the web are disunited, and the shaft has no secondary or accessory plume.

"On each side, about midway between the head and lower end of the bird, is a rudimentary wing consisting of three distinct portions.

"The part of the *humerus* that remains is about one inch in length; and from the appearance of the fractured end of the bone within the skin, was broken off clear below the head; the radial portion, figured by Shaw, appears to be made up, as far as can be ascertained by present examination, of two distinct bones, each about one and three eighths inches in length, covered with a corrugated skin, and ending at the carpal extremity in a small horny claw, supported on a short ungual (heel) bone, the two portions in conjunction measuring about three eighths of an inch.

"To the radial portion of the wing, several feathers are attached of the same character as those of the other parts of the body; but the feathers above and behind this rudimentary wing are longer than those of any other part of the body, and, being directed forward and downward, entirely cover and conceal this small and useless wing.

"As far as I am able to judge by the preserved skin, the *femur* was probably three inches in length, the tibia about five inches; the articulation of the tibia with the *tarsus* is one and three fourths inches below the end of the body, and on a line with the pendent ends of the plumage of that part. The *tarsus* is three inches in length, and measures two and one eighth inches in circumference. The other bones of the leg appear to have been like the tarsal bones thick and strong. The tarsi are covered with hard and dense reticulated scales, larger in size, and arranged in transverse lines in the front and behind, but smaller, and more irregularly distributed on the sides.

"No public or private collection is understood to possess another specimen of this singular bird; and it might reasonably be expected, that so defenceless an animal must soon fall, even to extermination, when assailed by powerful and ingenious enemies."

The apteryx is not represented as being generally distributed over either of the two islands of which New Zealand is composed, but to be found chiefly in the mountainous, dry, and stony tract near Cape East, on the eastern side of the northern island. The mountains there are not near so high

as in the southern island; their climate is warmer, and they are interspersed by rich grounds, though without those forests of large trees which are found on the slopes of the more alpine places and in the morasses between. The climate is rather humid, and that, with other circumstances, leads to the conclusion that, under small stones and in the shallow crevices of rocks, there should be an abundant, and, generally speaking, a perennial supply of insect food; and it is probable that such is the principal subsistence of the apteryx.

Voyagers who have seen the feathers adorning the mantles of the chiefs, have considered them as belonging to a species of emew of Australia; and the feathers are certainly very much of the same structure. But it must be borne in mind that neither the emew nor the apteryx has any of what may be called working feathers, conducive either to motion through the air, or to the direction of motion along the ground. The whole of their feathers, except in so far as, in the apteryx especially, the bristle-like ones may protect the eyes and the proximal part of the gape from injury, are wholly clothing feathers; and therefore the only inference that can be drawn from the similarity of structure is, that the two birds are exposed to pretty nearly the same kind of weather. Their feathers are a sort of pendent thatch, well calculated for throwing off the heavy rains which fall in those countries, and their loose and flocculent nature makes them also a good protection against the heat of the sun during the dry season. Thus far there is a resemblance between the two birds; and thus far we can see the necessity for that resemblance, in the analogy of the climates. But here the parallel ends; and in the present state of our knowledge, we are not able satisfactorily to continue it by a reference to any other known species of bird.

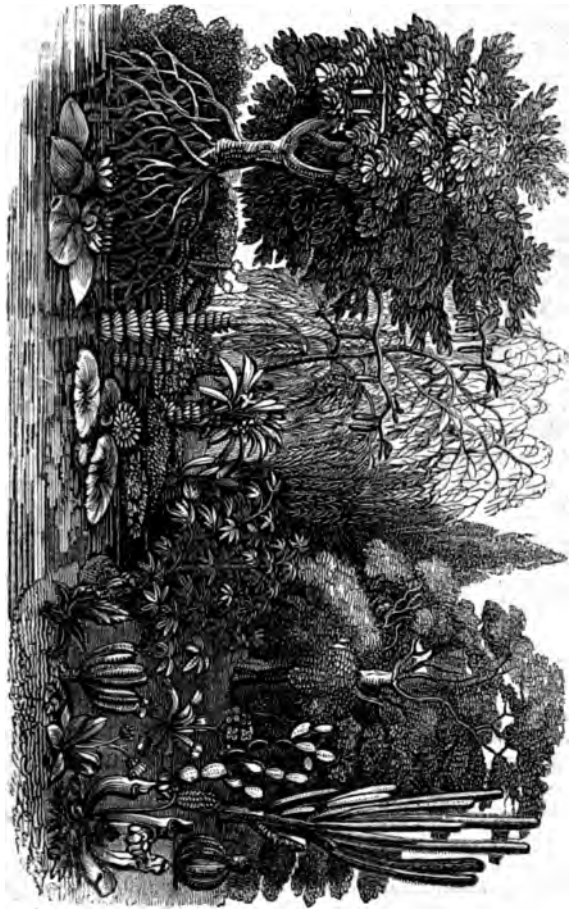
The Oriole defending her Nest.

SUBJECT VI.

GEOGRAPHICAL DISTRIBUTION OF PLANTS.

AVING reviewed some of t imal creation, we proceed t sider the globe as the habita the diversified vegetable which clothe the surface earth, adorn its scenery, an tribute to the sustenance of imal and human races. Th ductions of the vegetable ki are among the most useful a teresting objects we conten They are associated with the est and some of the purest ures of mankind; for ever will vividly recollect the experienced in his childho the appearance of the harb of the vernal season—the fl of the snowdrop, crocus, pri and violet, peeping up abo greensward, or from the hedgerows, proclaiming, in an obvious and in sive manner, "Lo, the winter is past, the rain is over and gone, the fl appear upon the earth, the time of the singing of birds is come." Th tivated flora of the garden, and the wild flora of the field, are among ou instructors, conveying, by their external configuration, lessons of purity and of grace to the mind in the age of its awakening susceptibilities. This is a moral and intellectual discipline, silent and unostentatious in its process, but of great importance in its effect as a source of valuable directive influence to the thoughts and feelings. But to man, in mature life, the larger plants and timber-trees are essential. His existence and civilization depend upon them. They furnish, with unbounded prodigality, the food which satiates his hunger, and gratifies his taste; supply many of the medicines that allay his sickness; afford him materials for a habitation; yield the means of transporting himself and his property over the land, and across the ocean; besides being the ornament of his walks during the period of their growth.

The Fuchsia.



Dicotyledonous Plants.

It belongs to botany, physiology, and agricultaral chymisty, to investigate the structure of plants; to unfold the riches of the vegetable kingdom with its different organizations, and the means by which their development and fructification are secured. The department of the physical geographer is simply to notice the general disposition of the vegetable tribes, and the circumstances which seem to regulate their distribution.

We have no more striking evidence of contrivance than in the wide dispersion of vegetable life, and in the different conditions under which it exists, at the extremes of terrestrial elevation and depression, of cold and heat, of light and shade, of solidity and solution. Forests of beech wave in the Himalaya at a greater height than that reached by the Finsterhorn of the Alps, or more than fourteen thousand feet; and there also shrubs flourish upon sites which are above the altitude of the hoary-headed Mont Blanc, the monarch of the European mountains. On the other hand, the bottom of the sea is clothed with an endless variety of green, red, and purple algæ; and, in the dark caverns of the ocean, the vine-leaved fucus produces its enormous fronds, with a hue as green as that of grass. Melville island, with its long dreary night, and nine or ten months of rigid winter, has in various places an abundance of moss, lichen, grass, saxifrage, the dwarf-willow, poppy, and sorrel; and Captain Parry found a ranunculus in full flower, in a sheltered spot, during the second week of June. In a diametrically opposite condition, some plants of the confervæ tribe thrive, living in hot springs, where the temperature is that of boiling water; and at the commencement of the seventeenth century a shrubbery flourished in the crater of the Vesuvian furnace. The rich black loam of the plains sustains luxuriantly an appropriate vegetation; while creeping plants derive sustenance from the hardest rocks, and alternate beautifully with the naked projections of mountain masses.

Within the tropics magnificent trees grow up under the direct action of the solar beams; and in dens and caves of the earth, which have never been visited by the light of day, vegetable life defies perpetual darkness. In the great cavern of the Guacharo, to the southeast of Cumana, Humboldt beheld with astonishment the progress of subterranean vegetation, after having passed a considerable distance beyond the point to which the daylight penetrates. The seeds which the birds carry into the cave to feed their young, spring up wherever they fix in the mould that covers the calcareous incrustations; and blanched stalks were noticed, which had risen to the height of two feet, with some half-formed leaves. During the visit of the traveller, these traces of organization amid darkness forcibly excited the curiosity of the native Indians, who examined them with the aid of their torches in silent meditation and fear, as if the subterraneous vegetables, pale and disfigured, had been phantoms banished from the face of the earth. To Humboldt, the scene recalled one of the happiest periods of his youth—a long abode in the mines of Friburg, where he had found plants growing in the complete darkness, green as well as blanched. The entire failure of moisture seems to be the only insurmountable obstacle to the growth of plants; for the sandy desert will "rejoice and blossom as the rose" wherever a very scanty supply of humidity gains access to it. De Candolle makes an interesting statement respecting the plant vulgarly known by the name of the rose of Jericho, *Anastatica Hierochuntina*, growing in the arid wastes of Arabia and Palestine. By the time it dies, owing to the great drought, its tissue has become almost woody; its branches fold over each other till the whole mass assumes the form of a ball; its seed-vessels have their valves tightly shut; and the plant remains adhering to the ground by a solitary branchless root. The wind, which always acts powerfully along the surface of a sandy plain,

uproots this dry ball, and rolls it along. If it chance to meet with a splash of water during its constrained but necessary journey, it speedily imbibes the moisture, which causes the branches to unfold, and the pericarps to burst; and the seeds, which could not have germinated if they had fallen on the dry ground, now sow themselves naturally in a moist soil, where they are able to grow, and where the young plant may support itself.

The number of known species of plants on the surface of the earth, mentioned by botanists from the time of Theophrastus to the present day, is thus given, in a memoir on geographical botany by Mr. Hinds, who accompanied the expedition of the Sulphur round the world, under the command of Sir Edward Belcher:—

B. C. 300.	Theophrastus	A. D. 1762.	Linnæus
A. D. 70.	Pliny	1806.	Persoon
1683.	Baubin	1820.	De Candolle

B. C. 300.	Theophrastus	500
A. D. 70.	Pliny	1,000
1683.	Baubin	6,000
A. D. 1762.	Linnæus	8,800
1806.	Persoon	27,000
1820.	De Candolle	56,000

Lindley, in 1835, gave the number at 86,000; but, according to Mr. Hinds, at the present time there are 89,000 species of plants described; and computing for countries scarcely examined, or as yet wholly unexplored, he supposes the total aggregate of species which vegetate on the earth to amount to about 133,000. This is an estimate which only goes a little beyond a similar calculation of De Candolle; and when we reflect that the interior of Africa, of Australia, and of the great islands of Oceanica, have not been visited by the geographer and the naturalist, the estimate will not be deemed extravagant. It illustrates the variety which marks the vegetable kingdom, and the work which still remains to be accomplished in the department of botanical discovery and description. Plants divided according to their station, or the physical nature of the locality to which they are adapted, are arranged by De Candolle in fifteen classes, to which two others have been added by M. Bory de St. Vincent.

The Hyssop.

1. Maritime or saline plants. These are terrestrial plants which grow on the borders of the sea, or of salt lakes; as *salicornia*, or saltwort, *salsola*, or glasswort, which abound on the shores of the Mediterranean, and are there generally burnt for soda, used in the manufacture of glass, especially at Marseilles.

2. Marine plants, as the *fuci* and many of the *algæ*, which are plentiful in the seas that wash our coasts, and are often attached to stones and rocks near the shore. They are either buried in the ocean, or, situated above low-water mark, are alternately immersed and ex-

posed to the action of the atmosphere; but none of them can be made to vegetate apart from its waters.

3. Aquatic plants, growing in fresh water; as *sagittaria* or arrowhead, *potamogeton*, or pondweed, *nymphæa*, or white waterlily. They occupy the beds of rivers, and vegetate in the midst of the running stream or in stagnant pools, being for the most part wholly immersed. The Pythagorean bean of antiquity belonged to this genus, and is probably identical with the produce of the *nelumbium*, a stately aquatic, common in various parts of the east, especially in China, where the ponds are mantled with its leaves and flowers.

4. Marsh or swamp plants, living in ground which is generally submerged, but occasionally dry; as *ranunculus aquatilis* and *sceleratus*, or water and celery-leaved crowfoot, *polygonum amphibium*, or amphibious persicaria.

5. Meadow and pasture plants, as a great number of grasses and trefoils.

The Reed

The Mandrake.

6. Plants found in cultivated fields. In this division many plants are included which have been introduced by man along with grain; as *centaurea cyanus*, corn blue-bottle, *sinapis arvensis*, or common wild mustard, *agrostemma*, corn-cockle, several species of *veronica*, or speedwell, and *euphorbia*, or spurge.

7. Rock or wall plants; as saxifrages, wall-flower, some species of *sisymbrium*, or hedge-mustard, *bromus*, or brome-grass, *linaria cymbalaria*, or ivy-leaved toadflax.

8. Sand plants, as *carex arenaria*, or sea-carex, *calamagrostis arenaria*, or small sand-reed, and *plantago arenaria*, or sand plantain. By the cultivation of these plants, large districts have been reclaimed from utter barrenness, and clothed with stately forests; and countries subject to a periodical invasion of sand, blown over them by the prevalence of certain winds, have been rescued from that calamity—one of the most useful agricultural enterprises of modern times. The plan was first adopted by an engineer of the name of Bremontier, on the coast of Gascony. He sowed, in the driest and most shifting sand, the seeds of the broom, *genista scoparia*, mixed with those of the sea-pine, *pinus maritima*, and then covered over the spaces that were sown with branches from the nearest pine forests, by which means the sand was to a certain extent prevented from shifting. The broom, which springs up first, serves the double purpose of further restraining the sand, and of nursing the young pines; and the foliage of the latter, after a growth of seven or eight years under shelter of the broom, becoming annually mingled with the sand, tends to fertilize it. After this period the pine overtops the broom, and frequently entirely kills it with its shade. In ten or twelve years the rising forest is thinned for the manufacture of tar, and for procuring branches to cover the newly-sown districts. After twenty years have passed, a fall of the trees commences for the manufacture of resin. Thus these forests, placed on the dunes or drifting sand-hills between the mouths of the Adour and Garonne, shelter the whole country behind them from the inroads of the element from the sea, and yield themselves a supply of an important article of commerce.

The Lentil.

9. Forest plants, including trees which live in society, as the oak, beach, elm, and fir, and the plants which grow under their shelter, as the greater part of the European orchises. Some of the former attain to enormous dimensions, and survive to a hoary antiquity. Four celebrated yew-trees in Great Britain, whose dimensions are on record, appear, from the number of concentric zones observable in a transverse section of their stems, to have lived respectively 1214, 1287, 2558, and 2880 years. In relation to the first of these examples, we have the testimony of history that this tree was in existence, and must have been of considerable size, in the year 1133, it being

recorded that the monks took shelter under it during the building of tain's abbey. De Candolle advances proof of an

Elm	of 335 years	Oriental Plane	720 years an
Cypress	about 350	Cedar of Lebanon	about 800
Cheirostemon	about 400	Oak	810; 1080; 1
Ivy	450	Lime	1076; 1147
Larch	576	Yew	1214; 1458; 2
Orange	630	Taxodium	4000 to 6000
Olive	700	Boabab	5150

The majestic forests of the equatorial zone contain trees of a mos tic size. On the banks of the Atabapo, a bombax caiba was meas Humboldt, more than 120 feet high, and 15 feet in diameter; and a village of Turmero, to the southwest of the city of Cumana, he fo famous *Zamang del Guyare*, a species of mimosa, with its trunk ne feet thick, and its hemispherical head more than 600 feet in circum the branches bending toward the ground in the form of an imme brella. The boababs of Senegal, and of the Cape Verde islands, still greater dimensions, several having been noticed with trunks from 50 to 100 feet in circumference.

10. Plants found on rubbish, or those which select the habitations of man and animals, on account of the salts and azotized substances which enter into their composition, as pellitory of the wall, nettles, and some mushrooms.

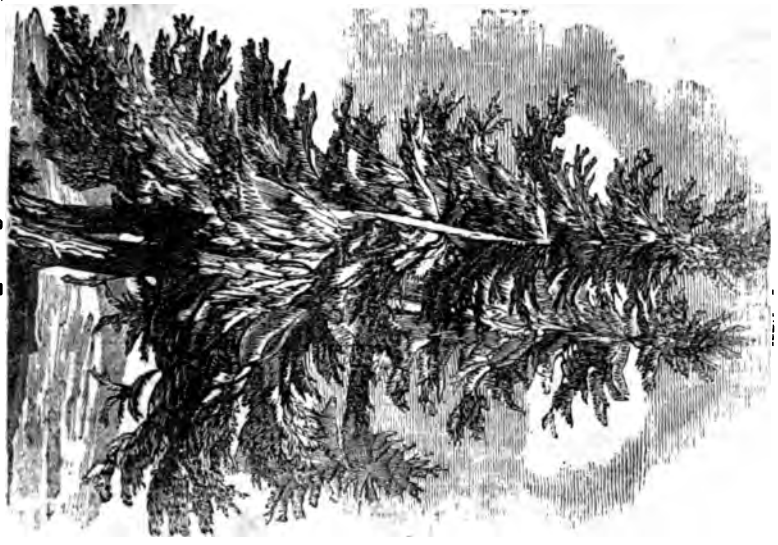
11. Plants of the thickets or hedges, comprehending the small shrubs which form the hedge or thicket, as the hawthorn and sweet brier; the herbaceous plants which grow at the foot of these shrubs, as tuberous moschatel, wood sorrel, and violets; and those which climb among their numerous branches, as bryony, black bryony, and some species of everlasting pea.

12. Subterranean plants, or those which live in mines and caves, entirely excluded from the light, as *byssus*, truffles, and some other cryptogamic plants.

13. Plants of the mountains, which De Candolle proposes to divide into two sections: 1. Those which grow on alpine mountains, the summits of which are covered with perpetual snow, and where, during the heat mer, there is a continued and abundant flow of moisture, as numero frages, gentians, primroses, and rhododendrons. 2. Those inhabiting ains on which the snow disappears during summer, as several spe snap-dragon, umbelliferous plants chiefly belonging to the genus a meadow saxifrage, and labiate plants.

The Thorn.

14. Parasitic plants, which derive their nourishment from other veg and which, consequently, may be found in all the preceding situations mistletoe, brown-rape, dodder, and a number of ichens, mushroom, and



Spruce-Tree.

15. Pseudo-parasitic plants, which live upon dead vegetables, or upon the bark of living vegetables, but do not derive their nourishment from them, as *epidendron*, lichens, and mosses.

16. Plants which vegetate in hot springs, the temperature of which ranges from eighty degrees to one hundred and fifty degrees of Fahrenheit, as *vitex agnus castus*, the chaste tree of the ancients, a species of osier, several cryptogamous plants, and *ulva thermalis*, the hot-spring laver.

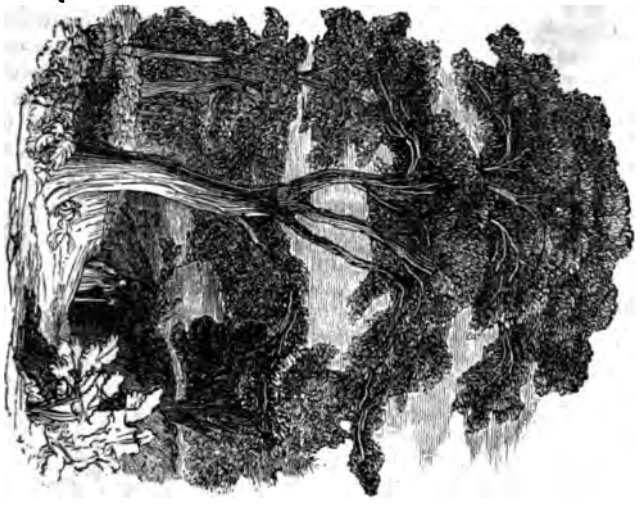
17. Plants which are developed in artificial infusions or liquors, as the mould found in Madeira wine, a species of conferva.

Dodder.

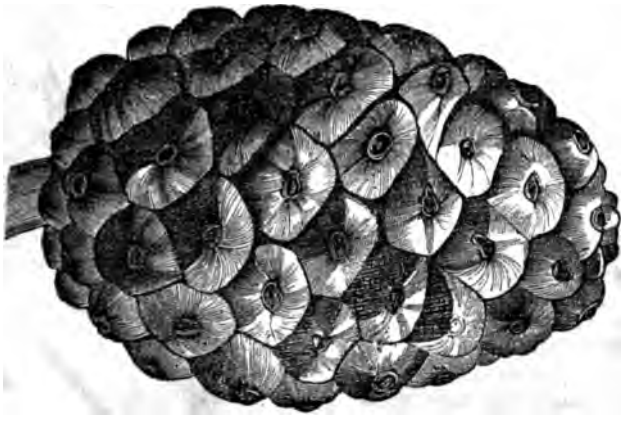
This is an arrangement of vegetable tribes, according to the physical nature of the station they occupy, but very different species are found upon similar sites in different parts of the world, a diversity partially referable to a diversity of climate, which we have seen to depend upon elevation and latitude. There are some general laws respecting the distribution of plants which it is not likely that any subsequent observation will modify. The proportion of the cryptogamic to the phænogamic species, or those which never bear flowers, as mosses and lichens, to the common flowering plants, increases as we recede from the equator. The cryptogamous plants are to the phænogamic, in equatorial countries, as one to five; in Australia, as two to eleven in France, as one to two, in several countries nearly equal, and over the whole globe as one to seven. The proportion of dicotyledonous plants, or those which have two seed-lobes, like most of the European trees, to the monocotyledonous, which have only one, as grasses, lilies, and palms, increases as we recede from the poles. The absolute number of species, and also the proportion of woody species to the herbaceous, increases as we approach the equator. The number of species, either annual or biennial, is greatest in temperate regions, and diminishes both toward the equator and the poles.

The group of ferns, mosses, lichens, and fungi, in the equatorial zone, constitutes one fifteenth of the vegetation on the plains, and one fifth of that on the mountains, while in the temperate zone it forms one half of the whole number of plants, and in the frigid zone almost the entire vegetation belongs to this family. The group of grasses constitutes in the equatorial zone one fourteenth of the whole number of plants that exist in it, the temperate zone one twelfth, and in the frigid zone one tenth, the maximum ratio being attained in the latter. The social plants, or those which live together, covering large tracts of country, like the common heath which is spread over the sand-hills of Jutland, Holstein, Hanover, Westphalia, and Holland, are comparatively rare within the tropics, and are only found on the seacoasts and upon elevated plains.

In the cold and inhospitable climate of high northern latitudes, where the ground is frozen hard during nine months in the year, and covered with snow several feet deep, the vegetable tribes are few in number, stunted in their appearance, and of analogous species in the polar regions of Europe, Asia, and America, the continents there being nearly united. Mosses and lichens—the

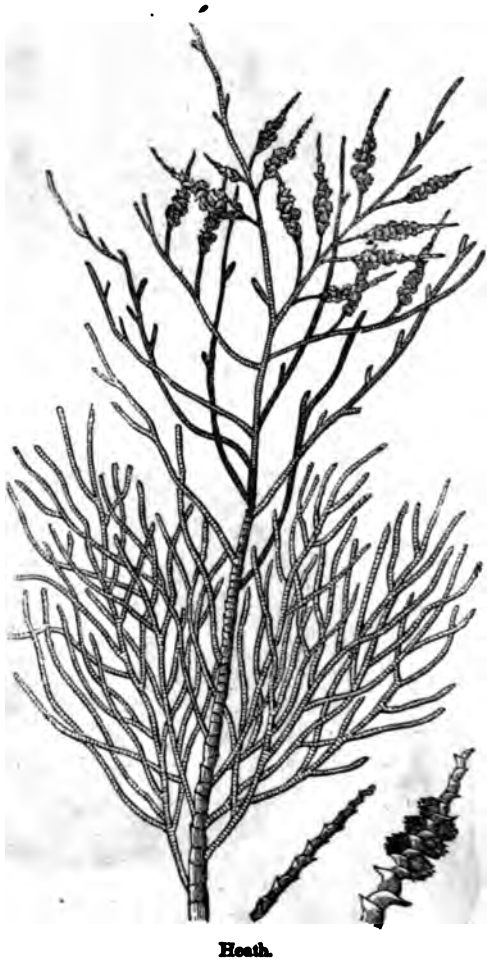


The Stone-Pine.



Cone of the Stone-Pine.

cryptogamia of Linnæus, and *acotyledones* of Jussieu—form one of the chief botanical features of the arctic zone, and extend in small and isolated tufts as far as travellers have been able to penetrate to the north. One species occurs in great abundance on the southern confines of this zone—the reindeer moss—covering of itself a large extent of country, and constituting the principal support of the animal after which it is called, and upon that animal the Laplander entirely depends for his own subsistence. The scurvy grass and sorrel, so valuable for their antiscorbutic qualities, flourish likewise under the almost perpetual snows, and during the short summer which the arctic fields enjoy, some low flowering herbs, the saxifrage, primrose, ranunculus, anemone, and yellow poppy, display their tints upon the sites which have a southern aspect. In receding from the pole, the first specimens of the higher classes of vegetation encountered are a few shrubs of wild thyme, and a species of willow expanding itself laterally to the extent of several feet, yet never rising more than two or three inches from the ground, showing the ungenial influence of the climate. Next comes the "lady of the woods," the birch, but shorn of her fair proportions—a mere dwarf—along with various kinds of bushes yielding edible fruit of delicious flavor, as the cloud-berry and arctic bramble. The latter grows in the wildest and most exposed districts of Lapland. It sometimes offered to Linnæus the only food he could obtain during his perilous journey in that dreary region; and hence the reference made to it in his work: "I should be ungrateful toward this beneficent plant, which often, when I was almost prostrate with hunger and fatigue, restored me with the vinous nectar of its berries, did I not bestow on it a full description." At the island of Hammerfest, near the north cape of Europe, in latitude seventy degrees, forty minutes, the birch grows in sheltered hollows between the mountains, attaining to about the human height; and in the low branches which creep along the ground, the ptarmigan finds a summer retreat, and breeds in security. The only other trees of any importance, that can maintain an existence within the arctic circle, are some of the pine species,



Heath.

and spruce fir, which in Norway pass a short distance beyond its
it chiefly the former. Barley is cultivated in this zone as high as
venty degrees, but it requires a favorable aspect and season in or-
ripened, for there is little more than three months between the loos-
the frozen ground and its being again bound up. Wahlenberg
: the cultivation of this grain succeeds wherever the mean temper-
ng ninety days rises to forty eight degrees. At Enontekeis, in Lap-
y and turnips yielded nine good crops in the thirty years between
1830. The preceding remarks apply to the arctic regions of Eu-
h have a less severe climate than those of Asia and America, and
tly a more copious vegetation, scanty as it is.
ig to the temperate zone, we find the pine tribe luxuriant at its
onfine, forming the magnificent forests of Scandinavia, where the
grows perfectly straight, sometimes to the height of two hundred
ice the Germanic name of this tribe, *nadel-holz*—needle-wood;
i's illustration in the splendid description of Satan:—

> "His spear, to equal which the tallest pine
> Hewn on Norwegian hills, to be the mast
> Of some great admiral, were but a wand."

occur in much more extensive forests, and with less admixture,
other genus of timber-trees, immense districts in North America
red with them; but they do not reach to such high parallels of lat-
e, or in Asia, as in Europe. The Norwegian pine is, however, far
by a transatlantic species, *pinus lambertiana*, growing singly on the
the west of the Rocky mountains. Several have been measured,
to be two hundred and fifty feet high, sixty feet in circumference
e, four and a half feet in circumference at the height of one hun-
dred and ninety feet, yielding cones eleven inches round, and from one foot to sixteen inches long, a transverse section of the trunk showing nine hundred annual rings. In descending into the temperate zone, we meet with the alder, aspen, and mountain ash. We then come to the extreme northern boundary of the oak, in latitude sixty-three degrees, at Drontheim in Norway, but in the eastern parts of Europe, the monarch of the woods is not found higher than fifty-seven and a half degrees, and in the eastern parts of Asia, the oak is only able to maintain a precarious existence on the banks of the Argouan, in the same latitude as London. Elm and lime trees are found at sixty-one degrees in Europe, the beech at fifty nine degrees, in connexion with most of the vegetable productions which are important to the sustenance of mankind. Rye is

The Fig.

cultivable with advantage as far north as sixty-six degrees; wheat is limited to sixty-two degrees, and oats will rarely ripen in a higher latitude. In the northern half of the temperate zone, the fruit-trees of the garden and orchard, the gooseberry, apple, pear, cherry, and plum, attain their greatest perfection, losing their flavor, and degenerating entirely in warmer regions. In the midland portion of this district, the vine, apricot, peach, almond, and mulberry, flourish; and further to the south is the country of the olive, orange, lemon, cork, and fig. To the westward of Milan, we first meet with fields of rice, yielding a whispering sound when agitated by the wind, a plant which can only be raised where there is a plentiful supply of water, an advantage enjoyed by the whole plain of Lombardy, in consequence of an admirable system of artificial irrigation, which the physical condition of the country favors. The flora of this region thus summarily passed over, exhibits exquisite specimens of form and color, but, perhaps, in successful competition with its floral developments, or with those of equatorial districts, we may place the vivid green of its grasses, trees, and hedgerows, under the reviving touch of spring. Corresponding latitudes in the western hemisphere present vegetable productions of great splendor, together with the careful cultivation of the more useful orders, as in the rice, cotton, indigo, tobacco, and sugar-cane plantations.

Tobacco Plant.

Sugar-Cane.

n the glowing regions of the torrid zone that vegetation exhibits its variety, and presents productions more splendid in their colors and n their form, more fragrant in their odors and pungent in their taste, y other climate. Wheat st other kinds of Euro- rn, will not form an ear e low levels of these ricts, and are only to be ed with success within pics, at an altitude of ve to nine thousand feet he level of the ocean, he moderate warmth of perate latitudes is en- There are several ex- s to this rule, created by culiarities for at ten de- nd a half north of the , in Venezuela, fields of end with plantations of ane, coffee, and plan- t no greater elevation a thousand nine hun- et above the sea-level, in the interior of the

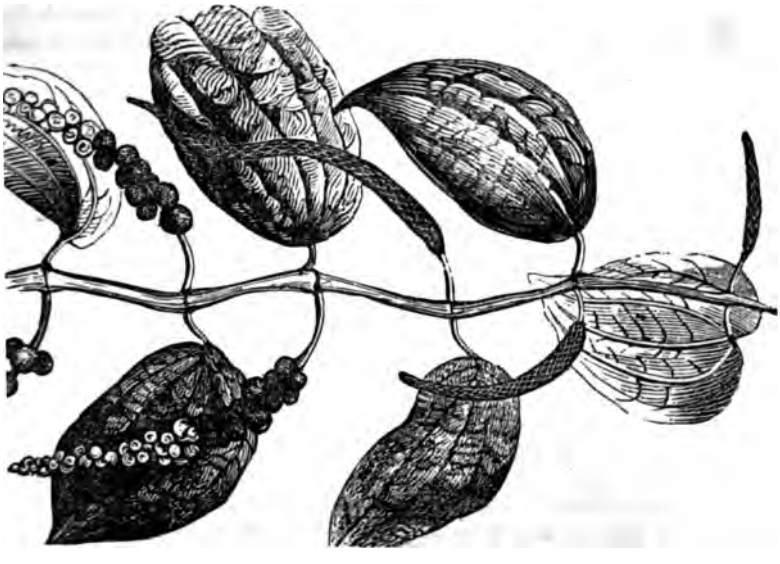
Coffee with the Flower and Berry

island of Cuba, fine harvests are raised at but a small height above the ocean. Various other kinds of grain, however, flourish abundantly upon the plains, as millet, maize or Indian corn, and rice, the latter being the chief food of perhaps a third of the human race, while valuable substitutes for grain are found in the bread-fruit and plantain, the cassava and manioc roots of America, the taro-root and yam of Polynesia. In the central parts of the torrid region, we find the plants which yield the most powerful aromatics—the vanilla, the cinnamon, the nutmeg, the pepper, the clove, and the camphor; but it is especially remarkable for the abundance and grandeur of its flora and timber-trees, whether growing singly or in forests. In Hindostan and Cochin China, the banian

The Banian-Tree.

or pagod-tree, *ficus Indica*, exhibits that vast size and peculiar, which rendered it the wonder of the ancients, the lateral branches sending down shoots which take root in the earth, and compose a grove, in process of time, out of the individual, sometimes covering an area of one thousand seven hundred square yards. Southey, in the Curse of Kehama, has well described this object:—

"'Twas a fair scene wherein they stood,
A green and sunny glade amid the wood,
And in the midst an aged banian grew.
It was a goodly sight to see
That venerable tree,
For, o'er the lawn, irregularly spread,
Fifty straight columns propped its lofty head;
And many a long depending shoot
Seeking to strike its root,
Straight, like a plummet, grew toward the ground,
Some on the lower boughs, which crossed their way,
Fixing their bearded fibres, round and round,
With many a ring and wild contortion wound;
Some to the passing wind, at times with sway
Of gentle motion swung;
Others, of younger growth, unmoved, were hung
Like stone-drops from the cavern's fretted height.
Beneath was smooth and fair to sight,
Nor weeds nor briers deformed the natural floor;
And through the leafy cope which bowered it o'er
Came gleams of chequered light.
So like a temple did it seem, that there
A pious heart's first impulse would be prayer."



The same tribes which are the slender and humble plants of northern regions, become lofty trees within the tropics, as several of the grasses, the bamboo rising to the height of sixty feet, the hollow stalk of which is capable of being constructed into capacious household vessels. Some of the family of *leguminosæ* are hardy-flowering trees, and contribute greatly to the beauty of the gardens of northern climes, as the robinia and the laburnum but they give way before the splendor and elegance of their tropical breth ren. The flowers of the erethrina, or coral-tree, are of the deepest and most brilliant crimson, and appear in profusion upon some of the loftiest trees of the forest, while the bauhinias, with their snake-like stems, and twin leaves hang in festoons from branch to branch of other trees, and are only rivalled by the less vigorous but more richly-colored blossoms of the carpopogons. But from these the mimosa bears away the palm, with its rugged trunk, airy foliage, and golden flowers, which cast a charm over even the sterile wastes of burning Africa.

All naturalists who have visited equinoctial America, have found it impossible to convey any adequate idea of the impression produced upon the mind by its forests, consisting of noble trees, thickly planted by the hand of nature, the trunks of which are not covered with moss and lichen, but with creeping plants ascending from the ground to the very summit of the trees, bind ing the whole together into a closely-united mass of vegetation, and adorning it with brilliant flowers. "When a traveller," says Humboldt, "newly arrived from Europe, penetrates for the first time into the forests of South America, if he is strongly susceptible of the beauty of picturesque scenery, he can scarcely define the various emotions which crowd upon his mind; he can scarcely distinguish what most excites his admiration—the deep silence of these solitudes, the individual beauty and contrast of forms, or that vigor and freshness of vegetable life which characterize the climate of the tropics. It might be said that the earth, overloaded with plants, does not allow them space to unfold themselves. So thick and uninterrupted are the forests which cover the plains of South America between the Orinoco and the Amazon, that, were it not for intervening rivers, the monkeys, almost the only inhabitants of these regions, might pass along the tops of the trees for several hundred miles together without touching the earth." Toward the junction of the Cassiaquaire with the Orinoco, "the luxuriousness of vegetation increases in a manner of which it is difficult, even for those who are accustomed to the aspect of the forests between the tropics, to form an idea. There is no longer a beach; a palisade of tufted trees forms the bank of the river. You see a canal two hundred toises (four hundred and twenty-six yards) broad, bordered by two enormous walls, clothed with lianas and foliage. We often tried to land, but without being able to step out of the boat. Toward sunset we sailed along the bank for an hour, to discover, not an opening, since none exists, but a spot less wooded, where our Indians, by means of the hatchet and manual labor, could gain space enough for a resting-place for twelve or thirteen persons." Mr. Darwin records similar facts and impressions: "During the second day's journey, we found the road so shut up, that it was necessary that a man should go abroad with a sword to cut away the creepers. The woody creepers, themselves covered by others, were of great thickness; some which I measured were two feet in circumference. Many of the older trees presented a very curious appearance from the tresses of a liana hanging from their boughs, and resembling bundles of hay. If the eye was turned from the world of foliage above, to the ground beneath, it was attracted by the extreme elegance of the leaves of the ferns and mimosæ. It is easy to specify the indi-

vidual objects of admiration in these grand scenes; but it is not possible to give an adequate idea of the higher feelings of wonder, astonishment, and devotion, which fill and elevate the mind. Among the scenes which are deeply impressed upon my mind, none exceed in sublimity the primeval forests undefaced by the hand of man; whether those of Brazil, where the powers of life are predominant, or those of Terra del Fuego, where death and decay prevail. Both are temples filled with the varied productions of the God of nature; no one can stand in these solitudes unmoved, and not feel that there is more in man than the mere breath of his body."

For utility and majestic port, the order *Palmæ*, the princes of the vegetable world, to use the appropriate phrase of Linnæus, constitute the chief vegetable glory of intertropical localities, though found in reduced dimensions in Spain, the neighborhood of Genoa, around Naples, and in Sicily. The date-palm with its cylindrical columnar stem, and crown of leaves, is a singularly graceful object in the deserts of the Old World:—

"Those groups of lovely date-trees bending
Languidly their leaf-crowned heads,
Like youthful maids, when sleep descending
Warns them to their silken beds."

The Date-Palm.

But in equinoctial South America the palm tribes appear in their greatest magnificence, fascinating and imposing to the eye of the traveller, as he beholds them on the granite rocks at the cataracts of Atures and Maypures, on the Orinoco, the light green of the leaves, waving in the breeze, strikingly contrasting with the darker surrounding vegetation. On the plains, which are subject to floods, the European is sometimes startled by seeing the tops of these trees lighted with fires. They are kindled by the Guanacas, a people who have remained for ages in these marshy districts, secured from the floods by living in the palms, where, with mats coated with clay, they construct hearths for the fires which are essential to their comfort. In other districts, the palm-groves, says Desfontaines, "being impervious to the sun's rays, afford a hospitable shade, both to man and other animals, in a region which would otherwise be intolerable from the heat. Under this natural shelter the orange, the lemon, the pomegranate, the olive,

the almond, and the vine, grow in wild luxuriance, producing, notwithstanding they are so shaded, the most delicious fruit. And here, while the eyes are fed with the endless variety of flowers which deck these sylvan scenes, the ears are at the same time ravished with the melodious notes of numerous birds, which are attracted to these groves by the shade, and the cool springs, and the food which they there find." The date, the cocoa-nut, and the sago palm, are of vast importance to mankind, for the nourishing farinaceous food they supply, and their extraordinary fecundity, which led to the assertion of Linnæus, that the region of palms was the first country of the human race, and that man is essentially palmivorous. The cocoa-palm produces annually, during the greater part of a century, one hundred of its large nuts, but the seje-palm of the Orinoco yields eight thousand fruits at a crop. A single spatha of the date-palm, the broad sheathing leaf which encloses the flowers, contains twelve thousand, while each spatha of another species, the *Alfonsia Amygdalina*, has two hundred and seven thousand flowers, and the individual plant six hundred thousand. The produce of the banana or plantain, another inhabitant of tropical climes, is still more enormous; a plant which requires little cultivation, and is to immense numbers of the human race, what rice is to the Hindoos, and wheat to the Europeans. According to a calculation of Humboldt, upon the same space of ground the weight of the yield in the case of bananas will be forty-four times that of potatoes, and one hundred and thirty-three times that of wheat.

The Plantain.

In thus proceeding through the vegetable kingdom from the pole to the equator, we come to different productions as we descend from the frozen to the cold, the temperate, the warm, and the hot regions; but as a change of elevation has the same effect upon climate as a change of latitude, the plants that are charactoristic of the high latitudes appear in succession upon the lofty mountains of those that are much lower. Tournefort found the plants that are peculiar to Armenia at the foot of Mount Ararat; above these he met with those that are common in France; at a still greater height he came to those that grow in Sweden; and toward the summit the vegetation of the polar regions appeared. The Alps, Pyrenees, and Andes, exhibit the same feature; and hence it may be regarded as a botanical axiom, that the flora of a mountainous country will be richer than that of another of less diversified as-

pect in the same latitude. The table states some interesting facts respecting vegetation on some of the mountains of the torrid and temperate zones. The fathom is equal to 6·39453 feet :—

	Andes of Quito, Latitude 0.	Mountains of Mexico. Lat. 20.	Caucasus, Lat. 42½	Pyrenees, Lat. 42¾.	Alps, Lat. 45½ to 46.
Distance between trees and the line of perpetual snow	600 fathoms	350 fathoms	750 fathoms	230 fathoms	450 fathoms
Upper limit of trees	1,800 fathoms	2,000 fathoms	1,000 fathoms	1,170 fathoms	920 fathoms
Last species of trees toward the snow	Escalonia Alstonia.	Pinus occident; the occidental pine covers the nevado of Toluca.	Betula alba. The common birch.	Pinus rubra. Pinus uncin.	Abies excelsa.
Distance between the snow and corn	800 fathoms	— —	630 fathoms	— —	700 fathoms

Marine botany exhibits a similar diversity of species in different temperatures and localities of the ocean. The Polar Atlantic, the West-Indian seas, the Indian ocean and its gulfs, the eastern shores of South America, the coast of New Holland, the Mediterranean and Red seas, have each peculiar kinds of algæ or sea-weed belonging to them, though some marine productions take a very wide range, and appear to be universally diffused. The genus *fucus*, which grows up to the surface from deeply-sunk rocks, forming immense beds, which act as natural breakwaters, and appear like extensively-inundated meadows, through which ships with difficulty can make their way, is found from the extreme southern islets near Cape Horn, along the whole western coast of South America, and in the tropical Atlantic ocean. It is abundant in the northerly regions of the deep. This plant is remarkable for the enormous length of its stems, in some cases reaching to three hundred and sixty feet. It is a striking example, also, of rapid growth. Mr. Stephenson found that a rock uncovered only at spring-tides, which had been chiselled smooth in November was thickly covered with *fucus digitatus* two feet in length, and *fucus esculentus* six feet, in the following May, within six months afterward. Some terrestrial plants, likewise, are extensively diffused, and adapt themselves to every variety of climate. The *Samolus valerandi*, a flowering marsh-plant, occurs all over the globe, associated with the birches of the frozen north, and with the palms of the burning tropics.

1, Sargamum Vulgare; 2, Macrocystus; 3, Fucus Vesicolosus.

But climate only suffices very partially to explain the phenomena of vegetable distribution; for under the same, or corresponding parallels of latitude,

at the same elevations above the level of the sea, and upon kindred soils, we find totally distinct genera, and different species. The genus *erica*, or the common heath, seems to be exclusively confined to one side of our planet. It is chiefly to be found in a narrow longitudinal zone, extending from the northern parts of Europe to the cape of Good Hope; for it rarely occurs in Asia, and of the one hundred and thirty-seven known species not one belongs to America. "Large commons without heaths," says Mr. Lyell, speaking of his first impressions in this country, in the neighborhood of Boston, "reminded me of the singular fact that no species of heath is indigenous on the American continent." On the other hand, the *cactus* family belongs as exclusively to the New World as the heaths to the Old. The beautiful and fragrant rose-tree appears to be entirely wanting as a native plant in South America, and throughout the southern hemisphere; and in general, comparing the vegetation of the two continents, where the same genera recur, the species are not identical. Humboldt found upon the lofty mountains of equinoctial America, where the climate corresponds with that of the temperate zone, plantains, valerians, arenarias, ranunculuses, medlars, oaks, and pines, which, from their physiognomy, might be confounded with those of Europe, but they were all specifically different. The plants of New Holland, with very few exceptions, are different to those of the rest of the world; and of sixty-one native species in the little island of St. Helena, only two or three are to be found in any other part of the globe. In some instances, upon travelling across a ridge of mountains, without any change of latitude, the vegetation is found quite different on the one side from the other. Nothing can be more striking than the contrast between the vegetation of the eastern and western sides of the chain of the Rocky mountains. On the eastern side, azaleas, rhododendrons, magnolias, with a variety of oaks and elms, form the principal features of the landscape; but beyond the ridge, most of these genera entirely disappear, and the giant pine becomes the chief object in view. Starting in an easterly direction through the northern parts of the Old World, we gradually lose the oak, the wild-nut, and the apple-tree, so common in Europe, upon crossing the Uralian mountains, and they cease to be met with beyond the banks of the Tobol; but in the eastern parts of Asia, on the banks of the Argouan, the two former occur anew, and the last reappears in the Aleutian isles.

Banksia.

There are multitudes of plants of a completely insulated growth flourishing spontaneously in a particular spot, and nowhere else. Examples occur upon the volcano of Guadaloupe, the table-mountain of the Cape, and upon some sites of New Zealand; but the most remarkable case of this kind is that of the cedar of Lebanon, which has never been found indigenous in any other locality. From the earliest times the cedars of Lebanon have been celebrated. Their timber was largely used in some of the most famous structures of the ancients, and was highly prized on account of its durability; for though not

Sea-Plants.

equal to the oak in absolute wear, it is so bitter that no insect will touch it When Solomon built his temple, he sent to Hiram, the lord-paramount of Lebanon, to procure the necessary quantity of cedar-wood for the structure; and the thirty thousand axes of the king of Israel must have deprived the heights of some of their noblest trees. Very few of the ancient stock now exist—whether owing to similar ravages, or to some change in the climate, it is impossible to determine. When Ballonius visited them in the year 1550, there were twenty-eight of the old race remaining. In 1575, Rauwolf found twenty-four; in 1680, Dandini found twenty-three; in 1738, Pococke counted fifteen; in 1811, Burckhardt could only number eleven; Dr. Richardson, in 1828, and Lamartine, in 1832, speak of only seven. The age of these patriarchs of the forest has been variously estimated. The inhabitants firmly believe them to be the remains of that identical forest which flourished in the time of Solomon. Lamartine supposes it a fair presumption, from their size and appearance, that they go back to biblical times. It is certain that they were regarded as very ancient several centuries ago; nor is it unlikely that they are the surviving relics of a second generation since the time of the Jewish king. The cedar, full grown, with its upward-inclining branches, is one of the most majestic and beautiful of the productions of the vegetable kingdom. The Arabs regard this inclination as a sign of intelligence, answering to instinct in animals, and reason in man; and it is asserted that this upward turning of the branch is always greater previous to the descent of the snow, as if the tree anticipated, and prepared to receive, the coming burden.

Various magnificent specimens of the cedar of Lebanon have been reared in England, but it has never been found growing wild apart from the Syrian mountains.

Owing to the exclusive confinement of individual families of plants to particular localities, or their predominance there, the globe has been divided into a series of botanical habitations, regions, or provinces, which are named after the most remarkable feature of their vegetation, or characterized by the geographical terms commonly applied to the districts. In the arrangement of Professor Schow both methods are adopted, but the latter only where a distinct botanical province is surmised, without a sufficient acquaintance with its productions being possessed to denominate it after those which are most predominant. There are about fifty botanical regions noticed by De Candolle; forty-eight by Mr. Hinds; and twenty-two by Professor Schow. From the latter the following arrangement is derived:—

1. The regions of saxifrages and mosses, or the alpine arctic flora. This region is characterized by the abundance of mosses and lichens; by the presence of the saxifrages, and gentians, chickweed tribe, sedges, willows; by the total absence of tropical families, and a marked decrease of the forms peculiar to the temperate zone, of the forests of firs and birches, and an absence of other forests. It is also distinguished by the small number of annual plants, the prevalence of perennial species, and by a greater liveliness in their simple colors. The region is divided into two provinces: 1. The province of the *carices*, or the arctic flora, which comprehends all the countries within the polar circle, with some parts of America, Europe, and Asia, which are to the south of it; more especially Lapland, the north of Russia, Siberia, Kamschatka, New Britain, Canada, Labrador, Greenland, and the mountains of Scotland and Scandinavia. The Laplander combs and dresses some species of *carex*, as we do flax, and in winter stuffs his shoes and gloves with it, as a protection against the extreme cold of the climate. 2. The province of primroses and rampions, or the alpine flora of the south of Europe, which embraces the flora of the Pyrenees, Switzerland, the Tyrol, Savoy,

Cedars of Lebanon.

the Apennines, the mountains of Greece, and probably the Spanish mountains.

2. The region of the umbelliferous and cruciferous plants, to which the hemlock, parsley, wall-flower, and cresses, belong. These tribes are here in much greater number than in any other region. Roses, crowfoots, amentaceous and coniferous plants, are also very numerous. The abundance of *carices*, and the fall of the leaves of almost all the trees during winter, form also chief features of this division. It may be separated into two distinct provinces: 1. The province of the *cichoraceæ*, including the sow-thistle, dandelion, and lettuce, which embraces all the north of Europe, not comprehended in the preceding region, namely, Britain, the north of France, the Netherlands, Germany, Denmark, Poland, Hungary, and the greater part of European Russia. 2. The province of the *astragali* and *cynarocephalæ*, to which the milkvetch, burdock, and thistle, belong, which includes a part of Asiatic Russia and the countries about the Caucasian mountains.

Wormwood.

3. The region of the *labiatæ* and *caryophillæ*, to which the pink, catch-fly, and sandworts, belong, or the Mediterranean flora. It is distinguished by the abundance of the plants belonging to these two orders. Some tropical families are also met with, such as palms, laurels, arums, plants yielding balsam and turpentine, grasses belonging to the genus *panicum*, or millet, and the true *cyperaceæ*, or sedges. The forests are composed chiefly of the amentaceous and coniferous tribes, as birches, willows, and oaks; the copses of *ericinæ*, or heath-tribe, and *terebinthaceæ*, as the mastich; and we meet with a great number of evergreen-trees. Vegetation never ceases entirely, but verdant meadows are more rare. The region is divided into five provinces: 1. The province of the cistuses, or rock-roses, including Spain and Portugal. 2. The province of the sage and scabious, including the south of France, Italy, and Sicily. 3. The province of shrubby *labiatæ*, or the Levant, Greece, Asia Minor, and the southern part of the Caucasian mountains. 4. The Atlantic province, including the north of Africa, of which Professor Schow has ascertained no distinctive character. 5. The province of the houselecks, or

Bignonia.

the Canary isles, and probably also the Azores, Madeira, and the northwest coast of Africa. Many houseleeks, and some spurges, with naked and spiny stems, particularly characterize this province.

Camellia.

4. The region of the *rhamni* and *caprifoliceæ*, to which the buckthorn and honeysuckle belong; or the Japanese region. It embraces the eastern temperate part of the old continent; namely, Japan, the north of China, and Chinese Tartary. The vegetation is indifferently known; but the mass appears to be temperate, yet singularly mixed with tropical forms. There are no large masses of oaks and firs, though these trees are common.

Monkey Flower.

The fruit-trees of southern Europe are abundant and productive; some spice plants appear; and cotton and tobacco are grown in considerable quantities. The tea shrub is cultivated in extensive plantations. The hedges of some of the farms also consist of it, and supply the drink of the laborers.

Aloe.

Coriander.

5. The region of *asters* and *solidagos*, Michaelmas daisies and golden rods. This is marked by the great number of species belonging to these two genera; by the great variety of oaks and firs, the small number of umbelliferous and cruciferous plants, the total absence of the heath, and the presence of more numerous species of whortleberry than are to be met with in Europe. It comprehends the whole of the eastern part of North America, with the exception of what belongs to the first region. It has been divided into two provinces: 1, that of the south, which embraces the Floridas, Alabama, Mississippi, Louisiana, Georgia, and the Carolinas; 2, that of the north, which includes the other states, such as Virginia, Pennsylvania, and New York.

6. The region of *magnolias*, chiefly large trees, with large leaves and highly odorous flowers, the perfume of which may be discovered at a great distance if the wind be favorable. It comprises the most southern parts of North America. The tropical forms, which show themselves more frequently than on a similar parallel of the old continent, are the chief features of the vegetation.

7. The region of *cactuses*, peppers, and melastomas. These families are here predominant, both as it regards the number of the species and of the individual plants. It is divided into three provinces: 1, the province of the ferns and orchises, comprehending the West India islands; 2, the province of the palms, including the lower parts of Mexico, New Granada, New Guiana, and Peru; 3, Brazil also seems to form a province, and may perhaps constitute a region of itself.

Frankincense.

8. The region of *cinchona*, or medicinal barks, comprising a part of the elevated regions of South America, from twelve hundred to five thousand feet above the level of the sea, included in the torrid zone. The cinchona belongs exclusively to this region, and forms its principal feature, from which we have the well-known and highly-valued Peruvian bark of medicine.

9. The region of *escallonias*, whortleberries, and winter's barks. It embraces the highest parts of South America. We also meet with alpine plants; as saxifrages, whitlow-grass, sandworts, sedges, and gentians. Perhaps, also, the mountains of Mexico belong to this region, although they may form a separate province—that of the oaks and firs.

10. The Chilian region. The flora of Chili differs essentially from those of New Holland, the cape of Good Hope, and New Zealand, although an approach to them is observable in the genera *goodenia*, *araucaria*, or Chilian

Passion-Flower.

Azalea.

Arbutus, or Strawberry-Plant

Cactus.

pine, *protea*, *gunnera*, and *ancistrum*. In a few favored valleys the ground is quite yellow with the multitudes of flowers of *pancratium amancaes*—a beautiful and rare specimen of the genus—whose expanding flowers are the signal for the commencement of the revels bearing its name.

11. The region of arborescent *compositæ*, or arborescent plants, with flowers like the dandelion and daisy. The great number of syngenesious plants, more particularly of the family of *boopideæ*, forms the chief feature of this flora, which approaches in a remarkable manner to that of Europe, while it differs entirely from those of Chili, the Cape, and New Holland. This region comprehends the lower part of the basin of the Rio Plata, and the plains which extend to the west of Buenos Ayres.

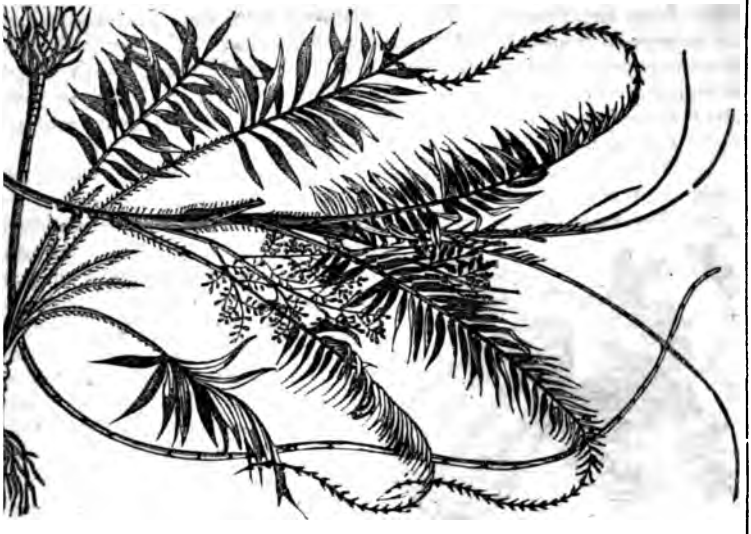
12. The antarctic region, formed by the countries near the straits of Magellan. The vegetation here has a considerable affinity with what is seen in the northern temperate zone. Polar forms, however, display themselves in the species of saxifrage, gentian, arbutus, and primrose. There is also a resemblance between the flora of this region and those of the mountains of South America, of Chili, the Cape, and New Holland.

The Pine-Apple.

13. The region of New Zealand. This flora, besides the plants peculiar to these islands, comprehends several others which belong to the extremities of America, Africa, and New Holland. The *phormium tenax* is here indigenous, whose numerous leaves the natives manufacture into matting; or coarse thread is separated from them and made into cordage and coarse linen, as is done from different species of aloe and agave in the Levant and southern Europe.

14. The region of *epacrides* and *eucalypti*, comprehending the temperate parts of New Holland and Van Diemen's Land. The former are ornamental plants growing upon high situations; the latter are lofty timber-trees. Besides these two families, from which the region derives its name, it is characterized by the presence of a great number of *proteaceæ*, *stylideæ*, *restiaceæ*, *diosmeæ*, myrtles, and acacias.

15. The region of *mesembryanthemum*, fig-marigolds, and stapelias. These two genera, as well as the heaths, are very abundant here. It embraces the southern extremity of Africa, where the family of heaths is found in greater quantity than anywhere else. But three or four humble British shrubs, with the heath of Spain, *erica Mediterranea*, were known previous to the conquest of the cape of Good Hope. Several hundreds of species were then brought to light, many of very elegant, and some of splendid appearance.



16. The regions of western Africa. We are only acquainted with Guinea and Congo, the vegetation of which is a mixture of the floras of Asia and America, bearing most resemblance to the former. A considerable number of grasses and sedges characterize this region, and the peculiar genus *adansonia*, the baobab—the largest known tree in the world. The name is derived from the French botanist Adanson, who first observed the tree upon his voyage to Senegal. He measured the trunks of several from sixty-five to seventy-eight feet in circumference, the single branches of which would be equal to monstrous trees: and where the water of a river had washed away the earth, so as to leave the roots of one partially bare and open to the sight, they measured one hundred and ten feet long.

17. The region of Eastern Africa, of the vegetation of which no definite knowledge is yet possessed.

18. The region of the *scitamineæ*, the turmeric, cardamom, and Indian shot, or the Indian flora. The scitamineæ are here much more numerous than in America, as well as the *leguminosæ*, such as pease and broom. The *cucurbitaceæ*, or the cucumber tribe, and *tiliaceæ*, or the lime-tribe tree, are also abundant, but in a less degree. The region comprehends India east and west of the Ganges; the islands of Madagascar, Bourbon, and Mauritius; those between India and New Holland; and perhaps the tropical part of this last continent.

The Melon.

19. The mountains of India form one or two regions, the vegetation of which differs from that of the plains. These countries perhaps constitute one region with nearly the whole of central Asia.

20. The floras of Cochin-China, Tonquin, and the south of China, notwithstanding their resemblance to that of India, present a sufficient number of peculiar indigenous plants to constitute a distinct region.

21. The flora of Arabia, Persia, differing from that of India and the Mediterranean, forms a particular botanical region, characterized by the numerous species of *cassia* and *mimosa*. Of the latter family there is the beautiful acacia of Lalla Rookh:—

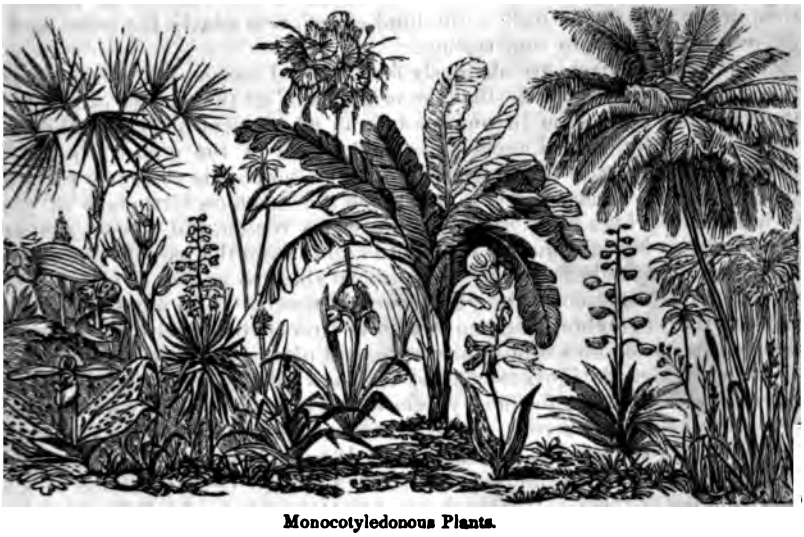
> "Our rocks are rough; but smiling there
> The acacia waves her yellow hair,
> Lonely and sweet, nor loved the less
> For flowering in a wilderness."

It is probable that Nubia and part of Central Asia belong to the same region; and Abyssinia, the elevated parts of which possess such a different climate, may form one of the great subdivision, or even a totally distinct region.

22. The islands of the South sea which lie within the tropics, form a separate region, but with a slender degree of peculiarity. Among two hundred and fourteen genera, one hundred and seventeen are found in India, and most of the remainder are in common with America. The bread-fruit tree is among the characteristics of these islands, although it is not confined to them.

To the preceding enumeration there should be added those islands which have a distinct vegetation, as Kerguelen's land, or the island of Desolation, the whole flora of which, when visited by Captain Cook, consisted of sixteen or eighteen species, all of which were considered to be peculiar to it. St.

ena is another example, characterized by an indigenous vegetation, not
ngle species of which is found on the continent of Africa, while not more
n two or three of its species occur on the continent of America.
t thus appears, upon examining different and distant localities, that each
a vegetation peculiar to itself, while a common analogy prevails among
m, where the physical condition of soil, temperature, and local circum-
nces are the same. Plants of the simplest structure, or the cryptogamic
es—the lowest orders in the vegetable creation—are the most exten-
sly diffused, the same species existing in far remote countries. Of the
ens observed in New Holland, two thirds are also natives of Europe;
l of the one hundred species of ferns discovered there, twenty-eight are
amon to other countries. It is very different with plants of the more per-
t kind, or the dicotyledonous tribes, the aggregate number of which,
own to Mr. Brown in New Holland, amounts to two thousand one hun-
d species, of which only fifteen, or about the one hundred and ninety-third
t, are found in Europe. Of the plants belonging to an intermediate
ss, or the monocotyledonous tribes, amounting to eight hundred and sixty



Monocotyledonous Plants.

ecies, there are thirty, or about the twenty-ninth part, chiefly grasses, that
native to Europe. "If the animal kingdom in New Holland," says M.
schenault, "offers remarkable peculiarities which isolate it from all other
rts of the world, the vegetable kingdom has a character no less distinctive.
is character relates not only to botanical differences, but likewise to a
ural physiognomy which would be remarked by the most careless obser-
r. The vegetation only of the southern parts of Africa can be compared
that of New Holland. In the same latitudes we find innumerable legions
heath and *Proteæ*, which include many shrubs remarkable for their grace-
and delicate forms, adorning the otherwise barren soil of either climate.
t in all the places we have visited, and above all, on the western side of
w Holland, we do not find, in the great masses of vegetation, either the
jesty of the virgin forests of the New World, or the variety and elegance
those of Asia, or the delicacy and freshness of the woods of the temperate
ntries of Europe. The vegetation is gloomy and sad. It has the aspect

of evergreens or heaths. The plants are for the most part woody: the leaves of nearly all are linear lanceolated, small, coriaceous, and spinescent. This contexture of vegetable productions is the effect of the aridity of the soil and the dryness of the climate. It is without doubt to these same causes that the rarity of cryptogamous and herbaceous plants is owing. The grasses, which elsewhere are generally soft and flexible, participate in the stiffness of other vegetables. The greater part of the plants of New Holland belong to new genera; and those included in the genera already known are of new species." Analogy, with still stronger diversity, marks the vegetation of most contrasted districts at some considerable distance from each other; but the analogy is striking between the flora of contiguous countries, not divided by arid deserts or high mountain chains. Thus England does not possess fifty species of plants which are not found in France; and the opposite shores of the Mediterranean have a kindred flora. On the other hand, there are scarcely any species to be met with in Senegal that are common to the North coast of Africa, the Great Desert dividing the two regions; and Mr. Darwin, upon crossing the Andes of Chili, was struck with the marked difference of the vegetation in the valleys on each side, though the climate, as well as the kind of soil, was nearly the same, and the difference of longitude very trifling.

The preceding facts are obviously fatal to the Linnæan hypothesis respecting vegetable distribution—that the originals of all the species of plants had their primary habitation in one spot, from which central region they have been diffused by natural agencies over the face of the globe. In order to provide that diversity of climate necessary to support in the same place arctic and tropical forms, Linnæus imagined the common birthplace of plants to have been a high mountain tract in a warm region, the various necessary temperatures being found at different heights from the base to the summit. This has been justly called a scheme more allied to poetry or fiction than to a serious investigation of the phenomena of nature. The ascertained condition of the vegetable kingdom is utterly irreconcilable with it. A second theory rejects the idea of a local centre, and places the original distribution of plants under the government of soil and climate: but this is scarcely more tenable than the former hypothesis, on account of totally different genera and species occurring under the same physical conditions. A third theory is an expansion of the Linnæan. It recognises every species or tribe as emanating from a primitive centre, each centre being the seat of a certain number of species, these primary habitations being in different parts of the earth. This hypothesis is most in harmony with facts. It accounts for the different botanical regions into which the surface of the earth may be mapped out; for the diversities of species under the same parallels of latitude; while the natural transporting agencies of Linnæus remain in full force, to disperse each species to a distance from its primal seat, and to intermingle the floras of different districts, not separated by insurmountable physical barriers to migration. Dr. Prichard, after examining the subject with great research and care, thus states the conclusion: "It appears, then, that the phenomena connected with the distribution of plants are only reconcilable with one hypothesis, or rather they lead us clearly to one inference, namely, that the vegetable creation was originally divided into a limited number of provinces. Each country had its particular tribes, which at first existed not elsewhere. This conclusion results more distinctly from the general difference in the species belonging to each of the great continents—a difference never called in question in respect to the principal masses of vegetation—and the great aggregate number of plants which, by their situa-

at a distance from seacoasts, and by the nature of their seeds, are ›ved from the chances of transportation; and secondly, from the arrange- : of gregarious plants round some peculiar foci, the individual species g spread out in various directions with reference to the central points."

ı relation to the plants which are diffused through different botanical re- s, we shall perhaps see reason to believe that they are not indigenous in f them, but that each has been dispersed from its original seat, by briefly ırting to the natural provision made to effect the diffusion. This includes ıgency of air, water, animals, and man.

he seeds of many plants are furnished with downy appendages or wing- by which, under the control of the winds, they are borne to a distance ı their birthplace; and where the breezes are permanent in one direction, ı the case of the trade-winds, their transportation to a far-remote site may ously transpire. The minute and almost impalpable sporules of the cryp- mic species, light as the finest powder, answering to the seeds of other ts, are most completely susceptible of atmospheric impulsion; and it is :tly this species that we find most extensively spread. De Candolle found species of lichen on the southwest coast of Bretagne, which had never ı met with in France before—the *sticta crocata* and the *physica flavicans* 'amaica, which he supposed had been brought from that island by the hwest winds. Linnæus records the striking case of the *erigeron cana- e*, or fleabane, which, after being brought from Canada, and introduced the botanical gardens at Paris, in the course of a century spread itself · all France, Italy, Sicily, Belgium, and Germany, the wind scattering the .s.

he brown linnet, when feeding on thistle-seed, perches on the top of weeds, and tears the downy head asunder, in order to reach the seeds ch are attached to the receptacle. During this act, many of the grains, g loosened, are borne away on their downy wings by the breeze to places listant from the parent-stem—the bird being in this case the indirect dis- inator of the thistle. Were the head not torn asunder in this manner, ten ne but it would become soaked with the rains of winter, and fall down · a few inches from the original stalk, instead of being transported, as it n is, across many miles of country. What is here mentioned of the linnet be witnessed in any thistlery, during some fine day in September, when birds are feeding in flocks, and scattering the down in every direction. greater part of the seeds is no doubt devoured by them, but a number escape, a fact which the bird is well aware of, as it frequently gives chase ıe stray ones as they are borne away by the wind. Even seeds which comparatively heavy, and not furnished with wings or downy appendages, easily uplifted by the stronger aerial currents, and compelled to take a ney of several leagues by the rush of the tempest. Such storms as the icanes that are common in tropical regions, which move at the rate of ı fifty to a hundred miles an hour, overturning buildings, and wrenching he largest trees, and conveying heavy fragments to a considerable dis- e, are potent agents in the dispersion of plants, introducing the seeds of e that are peculiar to one island into another, bearing them across wide s of the sea, and assimilating the vegetation of opposite shores.

he agency of water is another active and influential cause in the dissemi- on of plants. "The mountain stream or torrent," observes Keith, an able er on botany, "washes down to the valley the seeds which may acciden- · fall into it, or which it may happen to sweep from its banks when it lenly overflows them. The broad and majestic river, winding along extensive plain, and traversing the continents of the world, conveys to

the distance of many hundreds of miles the seeds that may have vegetated at its source. Thus the southern shores of the Baltic are visited by seeds which grew in the interior of Germany, and the western shores of the Atlantic by seeds that have been generated in the interior of America." The seeds of several terrestrial species are enveloped with a mucous matter, by which they are preserved for a long time from the injurious influence of the ocean, or some other peculiarity of structure or accidental circumstance affords protection, so that they are capable of germinating after a lengthened immersion in the briny deep. The fruit of the cashew-nut, *anacardium occidentale*, which grows on the island of Jamaica, has been drifted by the gulf-stream across the Atlantic to the western coast of Scotland, in such a condition as to have been capable of reproduction in a favorable soil and climate. By the same current the *lenticula marina*, or sargasso, a bean common to the same locality, arrives at the Orkney islands and the coast of Ireland; and an instance is recorded of the *guilandina bonduc*, or nicker-tree, one of the tribe of *leguminosæ*, having been raised from a seed which had accomplished the Atlantic passage. In a collection of plants gathered from the neighborhood of the river Zaire, on the west coast of Africa, about six degrees south latitude, Mr. Brown found thirteen species that are met with on the opposite shores of Guiana and Brazil. —These species were only found toward the lower part of the river, where they bear but a small proportion to the whole vegetation;—and, as they were chiefly such as pro-

Cashew-Nut.

Teasle.

luce seeds capable of retaining their vitality during a long immersion in the vaters of the ocean, it was inferred from these circumstances that they had een drifted in the intertropical seas from a transatlantic to an African site.

Animals, of various tribes, contribte to the dissemination of vegetable roductions. Nature has expressly rovided the seeds of several kinds f plants with an apparatus of barbs nd hooks for catching hold of the ool and hair of quadrupeds, and e feathers of birds, in whose locoiotion they participate. Fifty genra thus constituted are enumerated y Linnæus, among which the burock, teasel, and woodruff, are obvius examples; and such seeds are idely dispersed by animals of the heep and goat kinds, with the ox, orse, camel, deer, and buffalo, which t certain seasons are prone to rub emselves against the trees and hrubs. "A deer," observes Mr. yell, "has strayed from the herd hen browsing on some rich pasture, hen he is suddenly alarmed by the pproach of his foe. He instantly lunges through many a thicket, and wims through many a river and ake. The seeds of the herbs and hrubs adhere to his smoking flanks, nd are washed off again by the treams. The thorny spray is torn ff, and fixes itself in his hairy coat, ntil brushed off again in other thickts and copses. Even on the spot

Darnel.

here the victim is devoured, many of the seeds which he had swallowed im nediately before the pursuit may be left on the ground uninjured." Some naturalists have deemed the latter statement questionable, supposing that eeds and fruits can not escape being comminuted and destroyed in their passage through the stomach; but a variety of well-attested facts proves the conrary, of which the sagacious rook is aware, and hence haunts the exuviæ of nimals. Linnæus observes that to many it seems extraordinary, and somehing of a prodigy, that when a field is well tilled, and sown with the best heat, it frequently produces darnel, or the wild oat, especially if it be maured with new dung: they do not consider that the fertility of the smaller eeds is not destroyed in the ventricles of animals. Birds especially, as the innet, blackbird, and thrush, after feeding too rapaciously upon berries, are nown to part with them in an undigested state. It is not for the kernel or eed that birds swallow the haw and the elderberry, but for their pulp; and nany have their organs so constructed that the stone is ejected without injury. The seeds of the mistletoe and juniper, it is well known, are thus dispersed nd planted by birds; and acorns taken from the stomach of wood-pigeons ave so far preserved their vitality as to spring up into healthy saplings, upon eing sown, equal to the oaks grown in the usual way. The soft covering of

the nutmeg, known to us by the name of mace, affords a favorite repast at certain seasons to some species of the arboreal pigeons of the Indian archipelago. The nutmeg itself, which is generally swallowed with the whole of its pulpy covering, passes uninjured through the digestive organs of the bird, and is thus dispersed throughout the group of the Moluccas, and the adjacent islands. An example of a different way in which animals contribute to the dispersion of plants, may be taken from the habits of the common squirrel, led by instinct to lay up a store of food for the winter, as is the case with several other species. In the woods belonging to the duke of Beaufort, near Troy house, Monmouthshire (England), a squirrel was observed sitting very composedly upon the ground. In a few seconds he darted like an arrow to the top of a tree, and brought down an acorn, which was carefully deposited in the ground. The same process was repeated several times, the different acorns being laid up in different holes. We may suppose the place of deposition, in the case of some, to escape the memory of the little animal upon the return of winter, which germinate, and ultimately supply the place of the parent-tree.

Nutmeg.

The three agencies noticed compose a machinery competent to effect the wide dissemination of plants, nor is it extravagant to suppose their combined action resulting in an intermingling of the productions of far-distant botanical habitations. Tracing the operation of the causes in connexion, Mr. Lyell imagines a tempestuous wind, after bearing the seeds of a plant many miles through the air, delivering them up to the ocean. Its currents then may drift them to the shore of some remote continent, where, upon the fall of the tide, they are deposited; and finally some of the land-birds may thence convey them over hill and dale to their retreat, where from their exuviæ they germinate, and clothe the spot with a new vegetation. To the preceding causes of dispersion, we have now to add the agency of man, who by design, and involuntarily, has largely contributed to the diffusion of vegetable productions.

For the purposes of food, luxury, ornament, and use in the arts of life, an immense number of plants have been transported by the human race in their migration to climates, soils, and situations, where they are not indigenous. The cereal vegetables, so important to our sustenance, are importations into Europe, and thence have been taken by its inhabitants to various parts of the globe which they have colonized. The native country of these grasses has escaped remembrance, and can never now be ascertained—though Bruce states that he found the oat wild in Abyssinia, while other travellers have mentioned barley as growing wild on the banks of the Semara in Tartary, and wheat in hilly situations in the East Indies. But whether these valuable grains came originally from those countries, and when and how they migrated, are points equally unknown.

The New World received them from the Old at the hands of the Spaniards. One of the servants of Cortes found among the rice which served to support his troops three or four grains of wheat, which were sown in Mexico, probably about the year 1530. The name of the person who carried the first grains to Lima has been preserved—a Spanish lady, Maria d'Escobar. Upon being sown, their produce was distributed for three years among the colonists, each receiving twenty or thirty seeds. At Quito, the first European corn was sown near the convent of St. Francis, by Father Jose Rixi, a native

of Flanders; and the monks still show, as a precious relic, the earthern vessel in which the original wheat came there. "Why," asks Humboldt, "have not men preserved everywhere the names of those who, in place of ravaging the earth, have enriched it with plants useful to the human race?" In return, the Old World has received the potato from the New, which found its way to England from North America; but previously it had been brought to Spain from the southern part of the continent, where Humboldt searched in vain to discover it in a wild condition, and declares its native country to be unknown. The edible potato has, however, since his researches, been found wild in the neighborhood of Valparaiso, and Mr. Darwin met with it on the islands of the Chonos archipelago, off the coast of Chili. "The tallest plant," he remarks, "was four feet in height. The tubers were generally small, but I found one, of an oval shape, two inches in diameter; they resembled in every respect, and had the same smell, as English potatoes; but when boiled they shrank much, and were watery and insipid, but without any bitter taste. They are undoubtedly here indigenous; they grow as far south, according to Mr. Low, as latitude fifty degrees, and are called *aquinas* by the wild Indians of that part; the Chilotan Indians have a different name for them. Professor Henslow, who has examined the dried specimens which I brought home, says that they are the same with those described by Mr. Sabine from Valparaiso, but that they form a variety which by some botanists has been considered as specifically distinct. It is remarkable that the same plant should be found on the sterile mountains of central Chili, where a drop of rain does not fall for more than six months, and within the damp forests of these southern islands."

The vine, *vitis vinifera*, now naturalized in Europe, does not belong to it, but occurs in a wild state on the coasts of the Caspian sea, in Armenia, and in Caramania. The Greeks received it from Asia; the Romans from the Greeks, who planted it upon the banks of the Rhine, and introduced it into England. Previous to the Roman conquest, it is probable that the native Britons possessed no other fruits than the crab, the sloe, the hazel-nut, and the acorn; but the vegetable productions with which that people were enriched by their Asiatic conquests, gradually found their way into western and northern Europe, with the extension of the Roman empire.

Olive.

The plains of Spain and the south of France received the olive from Tuscany, to which it came from Greece, where it grows spontaneously, covering the beautiful plain of Athens as seen from Mount Hymetus, but its parent-spot is further eastward.

According to Sickler, a laborious writer on the history of cultivated vegetables, the Romans derived the fig from Syria, the orange

from Media, the peach from Persia, the apricot from Epirus, the pomegranate from Africa, the plum, the cherry, the apple, and the pear, from Armenia; but Epirus received the apricot from Persia, where it bears the figurative name of "the seed of the sun;" and probably it came thither from a southern region. A cherry-tree laden with fruit adorned the triumph of Lucullus, who brought it to Rome as a memorial of his triumph over Mithridates, in whose province of Pontus he had found the tree; and Pliny states that "in less than one hundred and twenty years afterward, other lands had cherries, even as far as Britain beyond the ocean." There is, however, a species of wild cherry, supposed to be indigenous to France and other parts of Europe. In all probability, most of the common fruits of Britain are standing memorials of Roman domination in the island. In like manner, the mad enterprise of the crusades contributed to the transport westward of the eastern vegetable treasures, the monks and ecclesiastics being diligent patrons of horticulture in the middle ages. Thus a variety of the plum—the damson, or damascene, as its name imports—was brought from Damascus during the crusades. The damask-rose came likewise from the same place—along with the narrow-leaved elm from the Holy Land; the conquests of the califs also were attended with the same result, the lemon migrating after them to the foot of the Pyrenees, though originally confined to India beyond the Ganges, where it now grows naturally. Culture has exerted a marked influence upon many of these plants, for which it is impossible to account—changing to some extent the form of their leaves, the habits of the trees, and the qualities of their fruits. The cultivated peach becomes one of the most delicious of fruits—but in its wild state in Medina it is poisonous, so that the Persians are said to-

Pomegranate.

Rose of Sharon.

have sent it into Egypt with the design of poisoning the inhabitants. There is a species of apricot in Barbary, called *Matza Franca*, or the killer of Christians, which becomes innocuous when tended by the skill and industry of man. Upon herbaceous and flowering plants, the influence of cultivation is not less conspicuous. Different kinds of cabbage—Savoy, broccoli, and cauliflower—are supposed to be derived from a plant which is sometimes found growing wild on the British coasts, the *brassica oleracea;* the clove, pink, and the carnation, are varieties of a flower found among the ruins of some of the old English castles, the *dianthus caryophyllus;* and the polyanthus is probably a derivation from the wild primrose. It is observed, however, that the primitive structure of plants never changes, however cultivated and far transported. The potato grown in Chili at the height of twelve thousand feet above the level of the sea, is identical with the potato of Siberia.

Involuntarily, man contributes largely to the propagation and dispersion of plants, some of which are useless to him, or positively noxious. Their seeds become mixed with the bales of merchandise which he transports, and with the ballast of ships, and are thus conveyed to a distance from their place of growth, accidental circumstances leading to their germination. De Candolle states, that at the gate of Montpellier there is a meadow set apart for the purpose of drying foreign wool after it has been washed; and that scarcely a year passes without some foreign plants being found naturalized in this drying ground, as *Centaurea parviflora*, *Psoralea palæstina*, and *Hypericum crispum*. There is a remarkable instance in South America of a European plant, which was probably introduced by accident, soon after the first colonists of La Plata landed in the year 1535, which has now taken such entire possession of a large district, as to have obliterated nearly the whole of the spontaneous vegetation. This is a species of thistle, *cynara cardunculus*, or cardoon, of the artichoke kind. In the Banda Oriental, remarks Mr. Darwin, "very many, probably many hundred square miles, are covered by one mass of these prickly plants, and are impenetrable by man or beast. Over the undulating plains, where these great beds occur, nothing else can now live. Before their introduction, however, the surface must have supported, as in other parts, a rank herbage. I doubt whether there is any case on record of an invasion on so grand a scale of one plant over the aborigines." Mr. Hinds is tempted to inquire, from its rifeness and luxuriance, whether plants may not find a situation more favorable to their existence than that in which nature has placed them—a question which the excessive development of this stranger, as well as that of *Psidium pyriferum* at Tahiti, a species of exotic guava, would seem to require an affirmative answer. The cardoon must not be confounded with the giant thistle of the pampas, so vividly described by Captain Head, from which it is essentially different. Fennel, another importation from Europe, has widely spread itself in the same region, covering the banks of the ditches in the neighborhood of Buenos Ayres and Montevideo. In like manner, the common English nettle speedily grew up in New England after the first colonists settled in the district.

When we consider the condition of the vegetable kingdom, and the operation of the preceding agencies, it is impossible to resist the conclusion, that different species of plants were originally planted by the Creator at several foci on the surface of the earth, many of which have been subsequently widely diffused by the causes enumerated. It has, indeed, been thought, that the occurrence of cryptogamous plants in mines and deep excavations of the earth, presents a case which can not be explained by any known method of dispersion, and which seems to favor the doctrine of equivocal production.

But striking facts deserve notice, which are calculated to remove the difficulty by establishing an extensive diffusion of seeds through the soil of the earth, in some instances at a considerable depth, which past geological catastrophes have imbedded, and which preserve their vitality, so as to germinate upon any accidental exposure to the action of the atmosphere. Dr. Prichard gives the following example, upon the authority of Professor Graham, of the university of Edinburgh. Previous to the year 1715, no broom grew in the king's park at Stirling; but in that year a camp was formed there, and the surface of the ground consequently was broken in many places. Wherever it was broken, broom sprang up. The plant was subsequently destroyed; but in 1745, a similar growth appeared after the ground had been again broken for a like purpose. Some time afterward the park was ploughed up, and the broom became generally spread over it. Some years ago a gentleman planted a garden in Stirlingshire, and as he was about to make a bleaching ground in the neighborhood, he took from six to nine inches of soil off the surface of the field intended for the purpose, and carried it into his garden, afterward sowing the field with grass-seed. In the field thus uncovered, seedling broom appeared as thick as the grass which had been sown. Professor Graham concludes that the seeds could not in either case have been supplied by the wind: first, because they are heavy, round, and without wings; and secondly, because all the broom-seed in the district could not have produced such crops as sprung up. The form of the ground is also such that no stream of water could have transported them. The seeds must have been in the soil, how long and how imbedded can not be conjectured. The case is still more striking in the United States, of soil turned up from the depth of many feet immediately yielding a crop of white clover. The occurrence of seeds thus buried in the soil of the earth, may explain the appearance of cryptogamous plants in mines in situations peculiarly inaccessible to the ordinary agents of dispersion; while the growth of wheat from grains found in the sepulchres of the Egyptian kings, after an entombment certainly of from three to four thousand years, sufficiently attests the tenacity with which enclosed seeds retain their vitality.

The adaptation of external nature to the wants of man is finely displayed by the vegetable tribes with which the earth is replenished, which minister in a thousand ways to his existence, health, convenience, and refinement. The reproductive power of some species, especially of the more useful kind, is an obvious instance of bountiful design: but, notwithstanding the evidence of it which the experience of the human race has already acquired, we are far from having had the limit of the prolific quality developed. The orange displays an extraordinary fecundity. A single tree at St. Michael's has been known to bear twenty thousand oranges in a season, fit for exportation, those damaged and defective amounting to at least one third more. The tea, sugar, and potato plants, yielding products which are necessaries of life to the cultivated nations, are additional examples, with the common grasses which clothe the hills and valleys with their refreshing green, forming the pastures upon which innumerable flocks and herds graze by day and repose at night. A single potato from the crop of 1844 was cut into twenty-eight sets, which yielded a produce of sixty-eight pounds' weight. In the harvest of 1840, an English agriculturist gathered from one of his fields some very fine ears of wheat, the proceeds of which filled a common wine-glass. This was planted the following autumn, and produced a peck of grain, which was again planted November 3, 1841, and yielded rather more than seven bushels. Upon this being sown November 3, 1842, the yield amounted to upward of one hundred and eight bushels, which, being returned to the soil in

the autumn of 1843, produced one thousand eight hundred and sixty-eight bushels. In some of the more fertile parts of the table-land of Mexico, the common return of the wheat harvest is from thirty-five to forty grains for one, and it frequently exceeds from seventy to eighty for one. It is not undeserving of notice, that the vegetable productions upon which the sustenance of man mainly depends, have the flavor of their fruits accommodated to his taste, being apart from the pungent and insipid, so that a sufficient quantity may be consumed without annoyance or disgust. Yet, as if to accomplish the law of Providence to the human creature—"In the sweat of thy face shalt thou eat bread"—the cereal and leguminous tribes, which furnish him with the staff of life, demand cultivation in order to be prolific and nutritive; while the chief vegetable support of animals—the permanently-green grasses—flourish without industry or skill.

The Crowned Pigeon.

SUBJECT VII.

TREES.

WE have given in our last subject an account of the distribution of vegetables. We will now proceed to describe a few of the most curious and remarkable trees, and first those of the PALM TRIBE.

The palm tribe is a stately and colossal order, so named from *palma*, the ancient appellation of the date, the most valuable among them, whose foliage was consecrated, by the Greeks and Romans, as an emblem of victory, and whose fruit, from the remotest antiquity to the present day, has been a principal article of food in the east.

The following sketches of this remarkable family of the vegetable kingdom, are from the magnificent botanical work of Messrs. Humboldt and Bonpland.

The family of the palm thrives best between the tropics. Yet some, which the travellers believe to have been wholly unknown previously to their visit to the Andes, approach the limits of everlasting snow. If the family of the palms is distinguished by beauty of form and its large size, from almost all the other families of vegetables, so likewise does it surpass them in the various uses to which they are applied. They furnish articles of the most dissimilar nature; wine, oil, wax, flour, sugar, and salt.

In the tracts to the north of the line, between the mountains of Caraccas and the river of Amazons, traversed by Humboldt and Bonpland, they found the palms in general in blossom in January and February, but some of them flower at other seasons of the year. Their fecundity is astonishing; the powerful action of the sap is developed, not only in thick umbrageous foliage, but also in an innumerable multitude of flowers and fruit. Not only the fields planted with palm-trees, but even the soil that has never been cultivated by man, is frequently covered to the depth of three inches with the fruit of the cocos butyracea, the Mauritia, &c. Every flower-capsule of the date-tree contains, according to Kæmpfer, above 12,000 male flowers. Humboldt and Bonpland have found a much greater number upon another species. In one single catkin-shaped bunch of flowers, of which each capsule contains from 110 to 120, they counted 1,800 male flowers; so that the total number in each capsule may be computed at 207,000 flowers. According to a similar calculation, every branch of a species which furnishes an excellent aliment on the banks of the Orinoco, produces 8,000 fruits, many of which indeed drop off before maturity. In the palm-grounds planted with the pihiguao, each tree yields annually, upon an average, 400 fruits of the shape of apples, and the Franciscans on the Orinoco and Guiana, know from experience, that whenever there is an uncommonly abundant crop of palm-fruit, the Indians grow remarkably fat. And M. Humboldt observes, that those species, the pith of which furnishes a kind of sago-flour, that forms an excellent article

of food, for the inhabitants of the New World, deserve to be particularly recommended to the notice of future travellers in America.

When the seed of a palm-tree is committed to the earth, the leaves unfold in succession, and increase in number, during four or five years. The crown of the root dilates in the same proportion. The bulb, formed by the reunion of the footstalks of the leaves, swells insensibly, its solidity gradually augments, and at length the stem rises above the surface of the ground, of the full diameter that it ever will acquire. The leaves, produced every spring, originate always from the summit. The older ones, standing below the others, gradually dry up, and, on separating from the stem, leave behind them circular impressions, which furrow its surface, and mark the years of its age, as long as it continues to grow. The stem is exactly cylindrical from top to bottom, and, if its measure be taken at different periods, no increase of diameter will ever be discovered.

"The dates hung from these trees in Egypt, in such large and tempting clusters," says Dr. Clarke, "although not quite ripe, that we climbed to the tops of some of them, and carried away with us large branches, with their fruit." In this manner, dates are sometimes sent, with the branches, as presents to Constantinople. A ripe Egyptian date, although a delicious fruit, is never refreshing to the palate. It suits the Turks, who are fond of sweetmeats of all kinds, and its flavor is not unlike that of the conserved green citron, which is brought from Madeira. The trees are very lofty, and, from the singular formation of their bark, we found it as easy to ascend to the tops of these trees as to climb the steps of a ladder. Wherever the date-tree is found in these deserts, it not only presents a supply of salutary food for men and camels, but Nature has so wonderfully contrived the plant, that its first offering is accessible to man alone; and the mere circumstance of its presence, in all seasons of the year, is a never-failing indication of fresh water near its roots. Botanists describe the trunk of the date-tree as full of rugged knots; but the fact is, that it is full of cavities, the vestiges of its decayed leaves, which have within them a horizontal surface, flat and even, exactly adapted to the reception of the human feet and hands; and it is impossible to view them without believing that He, who in the beginning fashioned "every tree, in the which is the fruit of a tree yielding seed," as "meat for man," has here manifested one among the innumerable proofs of his beneficent design. The extensive importance of the date-tree, is one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, of Arabia, and Persia, subsist almost entirely upon its fruit. They boast also of its medicinal virtues. Their camels feed upon the date-stones. From the leaves they make couches, baskets, bags, mats, and brushes; from the branches, cages for their poultry, and fences for their gardens; from the fibres of the boughs, thread, ropes, and rigging; from the sap is prepared a spirituous liquor, and the body of the tree furnishes fuel; it is even said, that from one variety of the palm-tree, the *phœnix farinifera*, meal has been extracted, which is found among the fibres of the trunk, and has been used for food.

Date-tree and Fruit.

There are few objects in the vegetable kingdom more remarkable and beautiful, or more useful to man, than the talipot-tree, which is a species of palm (the *corypha umbraculifera* of Linnæus) peculiar to the island of Ceylon, and the Malabar coast. It it is said to be found also in the Marquesas and Friendly islands. Robert Knox says that it is as big and tall as a ship's mast, but Cordiner gives more definite dimensions by stating that one which he measured was a hundred feet high and five feet in circumference near the ground. The stem of this tree is perfectly straight; it gradually diminishes as it ascends, the circumference of the upper part being about half that of the base: it is strong enough to resist the most violent tropical winds. It has no branches, and the leaves only spring from its summit. These leaves, which when on the tree are almost circular, are of such prodigious diameter that they can shelter ten or a dozen (Knox says from fifteen to twenty) men, standing near to each other. The flower of the tree which shoots above the leaves is at first a cluster of bright yellow blossoms, exceedingly beautiful to the eye, but emitting an odor too strong and pungent to be agreeable. Before its development the flower is enclosed in a hard rind, which rind, upon the expansion of the flower, bursts with a sharp noise. The flower shoots pyramidically to a great height, frequently adding as much as thirty feet to the elevation of the tree. From the flower proceed the fruit or seeds, which are as large as cherries, and exceedingly numerous, but not eatable; they are only useful as seeds to reproduce and multiply the tree. It appears that the natives do not sow them, but leave that operation entirely to nature. The flower and the fruit only appear once on one tree. Their appearance betokens that the tree has attained to old age, which, according to the natives, it does in a hundred years; Ribeyro, a Portuguese writer, says in about thirty years, which is more likely to be correct. As soon as the fruit or seeds are ripe, the tree dries up and decays so rapidly, that in two or three weeks it is seen prostrate and rotting on the ground. Knox asserts, that if the tree be cut down before it runs to seed, the pith, largely contained within the stem, is nutritious and wholesome, and adds that the natives take this pith, "and beat in mortars to flower, and bake cakes of it, which taste much like to wheat bread, and it serves them instead of corn before their harvest be ripe." We have not found these cakes mentioned by any other writer on Ceylon, but as Knox was so veracious and correct, we may admit that the natives were accustomed to make them. A better-known fact about the uses of the inner parts of the tree, is that sago is made from them. The stem or trunk of the talipot, like that of most other palms, is extremely hard without, but soft and spongy within, the greater part of its diameter being a soft brownish cellular substance. The sago is made by beating the spongy part of the stem in a mortar, by which means the fecula is procured. Still, however, the great usefulness of the tree is in its leaves. Growing on the tree, these leaves, when expanded, are of a beautiful dark green color; but those chiefly used, are cut before they spread out, and have, and retain for ages, a pale brownish yellow color, not unlike old parchment. Their preparation for use is very simple; they are rubbed with hard, smooth pieces of wood, which express any humidity that may remain, and increase their pliability, which is naturally very great. The structure of this wonderful leaf and the disposition of its fibres, will be best understood by a glance at the engraving opposite, in which the construction of the leaves is shown, particularly by the one in the right hand corner. The reader will there see that it is made like a fan, and like a fan it can be closed or expanded, and with almost as little exertion. It is in fact used as a fan by the natives of Ceylon, and is at the same time their only umbrella and parasol; in addition to which uses it forms

Talipot Palms in different stages of growth.

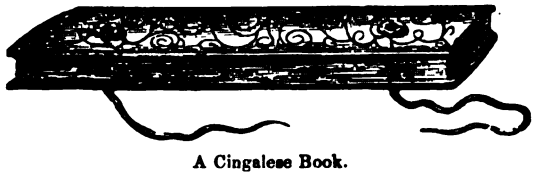
their only tent when they are in the field, and, cut up into strips, it serves them to write upon instead of paper.

The leaf is so light, that an entire one can be carried in the hand, but as this, from its great size when expanded, would be inconvenient, the natives cut segments from it, which they use to defend themselves from the scorching rays of the sun, or from the rains. The narrow part is carried foremost, the better to enable those who use them, to penetrate through the woods and thickets with which most of the country abounds. No handles are used, but the two sides of the leaf are grasped by the bearer. "This," says Knox, in his quaint manner, "is a marvellous mercy which Almighty God hath bestowed upon this poor and naked people in this *rainy country!*" He ought to have added in this *hot country*, for the heats of Ceylon, whose mean temperature is eighty-one degrees, are frequently, and for long periods, tremendous, and the talipot-leaf is quite as valuable a protection against them as against rain.

However much water may fall on the leaf it imbibes no humidity, remaining dry and light as ever. The British troops in their campaign in the jungles against the Cingalese in 1817 and 1818, found to their cost how excellent a preservative it was against wet and damp. The enemy's musket-men were furnished, each with a talipot-leaf, by means of which they always kept their arms and powder perfectly dry and could fire upon the invading forces, while frequently the British muskets, which had no such protection, were rendered useless by the heavy rains, and the moisture of the woods and thickets.

As tents, the talipot-leaves are set up on end. Two or three talipot umbrellas thus employed, make an excellent shelter, and from being so light and portable, each leaf folding up to the size of a man's arm, they are admirably adapted for this important service. The chiefs, moreover, have regularly-formed square tents made of them. In these the leaves are neatly sewed together and laid over a light framework; the whole is light, and can be packed up in a very small compass.

When used in lieu of paper, they are, as we have mentioned, cut into strips (those which we have seen are about fifteen inches long by three broad), soaked for a short time in boiling water, rubbed backward and forward over a smooth piece of wood to make them pliable, and then carefully dried. The Cingalese write or engrave their letters upon them with a stylus, or pointed steel instrument, and then rub them over with a dark-colored substance, which only remaining in the parts etched or scratched, gives the characters greater relief, and makes them more easy to read. The coloring matter is rendered liquid by being mixed with cocoa-nut oil, and when dry, is not easily effaced. On common occasions, they write on the leaf of another species of palm-tree, but the talipot is used in all government despatches, important documents, such as title-deeds to estates, &c., and in their books. A Cingalese book is a bundle of these strips tied up together. As even the



A Cingalese Book.

lawyers and the learned in this country are very deficient in chronological knowledge, great confusion occurs as to dates; and it is very common to see

ngalese judge attempting to ascertain the antiquity of a document pro-
d in court, by smelling and cutting it.
he oil employed in the writing imparts a strong odor which preserves it
insects, but this odor is changed by age. The talipot, however, appears
ave in itself a natural quality which deters the attack of insects, and pre-
es it from the decay of age even without the oil. It may be worth while
erving, that the Cingalese who engrave the most solemn of their deeds,
as the foundation of donations to a temple, on plates of fine copper,
ch are generally neatly edged with silver, always make these plates of
cisely the same shape as the talipot strips used for writing.
Besides all the uses described, the Cingalese employ the talipot leaf ex-
sively in thatching their houses. They also manufacture hats from it;
e hats are made with brims as broad as an outstretched umbrella, and
chiefly worn by women nursing, to defend them and their infants from
heat.
The talipot is not a very common tree at present, and is rarely seen grow-
by those who only visit the coasts of the island and do not penetrate into
interior. It seems to grow, scattered among other trees in the forests.
A remarkable tree of the palm family is seen near the town of Orotava,
the island of Teneriffe, of the species called the DRAGON-TREE, which
been described by
scientific traveller
mboldt. This tree
ituated in the garden
M. Franqui. There
existing documents
ich show that the
nk of this tree had
ained its present vast
e in the fifteenth cen-
y. Its height is about
ty feet; its circum-
ence near the root is
ty-eight feet. At the
ght of ten feet above
soil, Sir George
unton found that its
meter was twelve
t. The trunk divides
a great number of
nches which rise in
form of a candela-
, each of which is
minated by a bunch
leaves. It still bears

The Dragon-Tree of Orotava.

wers and fruit. This remarkable tree is considered by Humboldt to be
of the oldest inhabitants of this globe. The species is of very slow
wth; and it is judged that a thousand years must have elapsed before
specimen had attained maturity.
THE CABBAGE-TREE.—This magnificent tree is the *areca oleracea* of Lin-
us; class *monœcia*, order *monadelphia*. It is also known as *palma max-
a*, and *palmeto royal*, which name it has probably received from its great
ight and the beauty of its graceful, waving foliage. It is found as well in
valleys as on the mountains in the West Indies. Its numerous dark-

colored roots have the appearance of so many round thongs; they are of great length, extending some yards into the ground where the nature of the soil is sufficiently sandy or porous to admit of their so doing. The trunk of the tree (which is usually about six or seven inches in diameter) is a little enlarged at the base, thence it grows straight as an arrow (particularly when of about thirty years' growth) gradually tapering to a height, as has been stated of three hundred feet, but this is an exaggeration. Ligon mentions having seen these trees in Barbadoes as high as two hundred feet; Bryan Edwards, in Jamaica, upward of one hundred and fifty; Bayley, in other islands, from seventy to one hundred and twenty. Hughes considers the highest in Barbadoes, where they abound more than in the neighboring islands, not to have reached more than one hundred and thirty-four feet. The substance of the tree, for about two or three inches in depth, is of a dark color, and extremely hard and solid; within this is a rather white pith intermingled with small veins of a more ligneous nature. The hue of the bark resembles that of the ash, and is faintly marked at the distance of every four or five inches by the *vestigia* of the branches that have fallen. The appearance of the bark continues the same till within about twenty or thirty feet of the summit of the tree, where it changes to a beautiful deep sea-green, which color prevails to the top. About five feet above the commencement of this color, numerous branches encircle the stem, the lowermost spreading horizontally, with great regularity, while the superior branches incline wavingly downward with all the graceful elegance of so many plumes of feathers. The branches, which attain, when full grown, a length of about fifteen feet, are closly set on the stem, alternately rising one above another. Their broad curved sockets completely surround the body of the

The Cabbage-Tree.

:e, which is again visible among the upper branches, and is there enveloped an upright green conic spire, which beautifully terminates its majestic ight. The branches are slightly grooved on the upper side, and rounded neath. An immense number of pinnated leaves proceed from the branches, me of which are three feet in length and an inch and a half in breadth, adually narrowing toward their points, and decreasing in length as they proach the extremities of the branches. The upper side of the leaf is nooth and shining—a strong and prominent rib in the middle of each fords it support on the lower side. It is part of the economy of this ee that the inferior or lower branch drops off monthly, bearing with it a exfoliated circular *lamina* of the green part of the stem; whenever is occurs, the green conic spire which arises from among the superior ranches, partially bursts, and sends forth a young branch, which remains e uppermost till the same process is again renewed, so that the spire, e common parent of all, thus continually supplies the loss of the lower ranches, and the beauty of the tree remains undiminished. The green olored part of the stem differs not only in hue but in substance from at of the other part, as it is formed of several *laminæ* or separate layers of tough bark of a like nature, about a quarter of an inch in thickness, which re arranged closely over each other. All the branches, as they successively row to be old, are united by the broad socket of the footstalk to this outer *amina* or layer; some time before the lower branch is quite withered, the reen circular layer, which before appeared a solid part of the tree, divides ertically, preparatory to its falling off with the branch to which it is strongly ttached, leaving the next succeeding layer apparently a constituent part of he tree. The first, second, third, and sometimes the fourth, of these *laminæ*, are green on the exterior and white within. The remainder of them ave the outer side of a bright lemon color, and the interior white. The part called the cabbage consists of the inner snow-white flakes, which contain a considerable portion of oil; they have something the flavor of an almond, and are esteemed a sweet and agreeable esculent; they are eaten raw, fried, or boiled, and, when they have undergone the latter process, are not unlike cabbage.

It is a well-known fact, that cutting the cabbage destroys the tree, which may be the growth of half a century. The cabbage is consequently a dish principally seen at entertainments, and two negroes are usually despatched to the mountains where these trees abound, to cut what are required. The blossom displays itself at that part of the stem of the tree where the two colors unite. On its first appearance it is a husky *spatha*, growing to a length of about twenty inches, which is full of small white stringy filaments, with alternate protuberant knobs, not unlike a fringe of coarse white knotted thread; farinaceous yellow seed in embryo, resembling fine saw-dust, is dispersed among the filaments, which, after they are cleared of this dust, are converted into an excellent pickle. If the *spatha* is not cut young for this purpose, when ripe it bursts, and the filaments become ligneous with a bushy growth, consisting of many small leaves which produce numerous small oval thin-shelled nuts, about the size of unhusked coffee berries. The soft part of the leaves being removed, the inside texture is spun the same as hemp or flax, and is used for cordage, fishing-nets, and things where strength is desirable. From the hard outside of the stem, laths for houses are cut, which are of great durability; and this wood is also applied to other useful purposes. Hughes ("Natural History of Barbadoes") states that when the trees are felled, or fall by the violence of the hurricanes, a species of grub breeds in the soft part of the trunk, which are about the size and length of

the first joints of the thumb, and are eaten and esteemed a delicate morsel by the French of the neighboring islands.

The cabbage-tree must be familiar to many readers, from the allusions to it in the tale of "Paul and Virginia."

Cacao-Tree.—The cacao-beans, from which chocolate is made, and which, prepared in lumps or cakes, or in powder, is sold as cocoa, are the seeds of the *theobroma cacao* of botanists. This tree grows to the height of fifteen or sixteen feet. The fruit (see the engraving below) resembles a cucumber, and is commonly about three inches in diameter. It is smooth on the outside, and has a yellowish-red color. The seeds are known to be ripe by their rattling when the capsule is shaken. The cacao-tree bears leaves, flowers, and fruit, all the year through. It is a native of the tropical regions of America, where it is largely cultivated; and it is also cultivated in many of the West-India islands.

Cacao-beans are frequently misnamed cocoa-nuts, by which means they are confounded with coco-nuts *(cocos nucifera)*, a fruit which is often misspelled cocoa-nuts. On account of these mistakes in the spelling of the fruits of the two trees, many persons suppose that the manufactured seeds of the cacao-tree, or chocolate, is the produce of cocoa-nuts.

The cacao-tree was cultivated by the aboriginal inhabitants of America long before it was discovered by Columbus. They made a beverage of the seeds, but authorities are divided in regard to how it was prepared. From time immemorial the seeds have been employed as money in some parts of America. Chocolate appears to have been first manufactured in Mexico, and the Creole ladies were for a long time so fond of the beverage that it was habitually served to them, —even in church—by their slaves.

Leaf, Flower, and Fruit, of the Cacao, with a Pod opened.

Chocolate is manufactured in the following manner: the cacao-beans are carefully examined, and the sound and good only selected.—They are then dried, and the shells removed. The kernels are then submitted to the fire for the purpose of being roasted. This operation being finished, the seeds are bruised upon a hot stone until they form an oily paste. The requisite quantities of sugar and spices—generally finely-powdered cinnamon and vanilla—are then added. When the mixture is formed into a homogeneous compound, it is put into polished iron moulds, of different sizes. In the manufacture of chocolate, various nutritive substances

Cacao-Tree.

are sometimes used, such as salop, arrow-root, tapioca, &c., and some manufacturers have the art of giving it the odor of coffee.

Cacao-beans, after being dried, or partially roasted, shelled, and ground in a mill, are much used in this country. Two tablespoonfuls of the powder may be added to a pint and a half of milk-and-water; after boiling, let the pot simmer over the fire for about ten minutes, when the beverage will be fit for use. Sugar and milk are to be added as required.

The thin pellicle or shell that covers the beans, and which is separated before they are ground or powdered, contains a considerable quantity of mucilage, and the bitter principle of the cacao. Some persons prefer a beverage made from the shells to a preparation made from the beans. The shells are said to be greatly employed as a substitute for the beans in Switzerland, Belgium, and Ireland.

The Cow-Tree.—So little does the existence of this tree appear to have gained credit, or even to have been known, in Europe previous to the scientific expedition of Humboldt and Bonpland, that the former of these travellers seems to have heard of it for the very first time on his visit to Porto Cabello, in the beginning of March, 1800; and until convinced of the reality of the fact by actual observation, he admits that he was led, from his previous knowledge of the acrid, bitter, and more or less noxious properties of the milky juices of plants in general, to regard the accounts he had received of this tree with doubt and suspicion. A trial of the milk, which he and his companion tasted for the first time on his second visit to the plantation of Barbula, on his return from Porto Cabello by the new road to Valencia, completely removed his doubts, and satisfied him that the accounts he had received were neither fictitious nor exaggerated. "We drank," says this distinguished traveller, "considerable quantities of it in the evening, before we went to bed, and very early in the morning, without feeling the least injurious effect." He describes this milk as tolerably thick, glutinous, perfectly bland, and destitute of acrimony, and possessing an agreeable and balmy smell; and only complains of its glutinous property rendering it slightly disagreeable. This vegetable-milk forms a principal article of food with the negroes, and poor people who work in the plantations. They take it along with bread, made either of the root of the cassava *(janipha manihot)*, or of Indian corn *(zea mayz)*; and, according to the testimony of the major-domo of the farm, these people grew sensibly fatter during the season in which this milk is obtained in the greatest abundance. But it is not in its appearance or taste alone that this milk resembles that of animals, but in its possession of a strongly-animalized substance, which separates from the liquid on its exposure to the air, and which the inhabitants regard as analogous to cheese, and name it accordingly.

This extraordinary tree is supposed by Humboldt to be peculiar to the Cordillera of the coast, particularly from Barbula to the lake of Maracaybo. A few plants grow near the village of San Mateo, so celebrated for the cultivation of wheat; and it was also found by that distinguished botanist, Mr. Bridemeyer, at a distance of three days' journey to the east of Caraccas, in the valley of Caucagua, where it is known by the name of *arbol de leche*, or the milk-tree; and where the inhabitants, as Humboldt acquaints us, "profess to recognise, from the thickness and color of the foliage, the trunks that yield the most juice—as the herdsman distinguishes, from external signs, a good milch cow." At the farm of Barbula, this vegetable fountain is more aptly termed the *palo de vaca*, or cow-tree. It rises, as Humboldt informs us, like the broad-leaved star-apple *(chrysophyllum cainito)*, to a height of from thirty to forty feet, and is furnished with round branches, which, while young, are

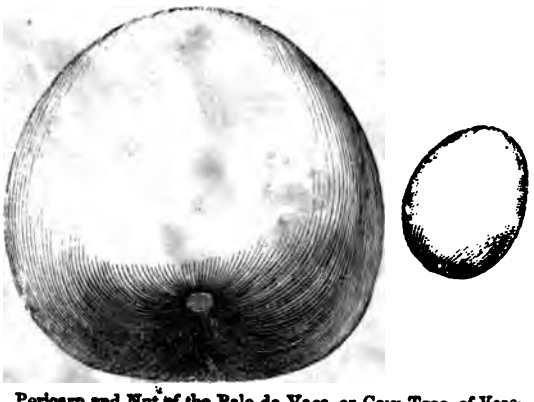
angular, and clothed with a fine heavy down. The leaves are alternate, petiolate, oblong, rounded at either extremity, and terminated with a very short point, or acumen—very entire at their edges—their veins reticulated, and the primary ones projecting on the surface; they are tough or leathery, very smooth, nine or ten inches in length, and hardly four in breadth: the petioles, or footstalks of the leaves, are thick, furrowed, smooth, eight or nine inches long, and unfurnished with stipules at their base. The flowers, unfortunately, have never yet been seen by any botanist, and hence nothing is known with certainty as to the genus to which it belongs: the fruit resembles the drupe of a walnut, is fleshy, globular, and (when recent) green, containing one or two one-seeded nuts. The trunk, on being wounded, yields its bland, agreeable, and nutritious fluid, in the greatest profusion, especially at the rising of the sun. "It is not here," says Humboldt, "the solemn shades of forests—the majestic course of rivers—the mountains wrapped in eternal frost—that excite our emotion. A few drops of vegetable juice recall to our minds all the powerfulness and the fecundity of nature. On the barren flank of a rock grows a tree with coriaceous and dry leaves. Its large woody roots can scarcely penetrate into the stone. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced, there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The blacks and natives are then seen hastening from all quarters, furnished with large bowls to receive the milk, which grows yellow, and thickens at its surface. Some employ their bowls under the tree itself, others carry the juice home to their children. We seem to see the family of a shepherd who distributes the milk of his flock."

But although the existence of this tree has been supposed by Humboldt to be confined to the narrow limits of the Cordillera of the coast of Venezuela, we are inclined, from other evidence, to believe that either the same, or a tree of the same or of a kindred genus, is to be found far more extensively diffused throughout the forests of the New World. There is a Mexican tradition preserved in a manuscript in the Vatican, and which is quoted by Humboldt, furnishing a ground for believing that stocks of this tree formerly existed, and may perhaps yet be found, in some of the almost unknown regions of the extensive territory of New Spain; and we possess direct evidence of the existence of three distinct trees, possessing very nearly similar properties, in the vast and humid forests of the provinces of Chocò and Popayan.

Mr. Thomas Higson, formerly engaged in commercial transactions in South America, but latterly resident in the island of Jamaica, in a letter addressed to Mr. Watts, the British consul at Carthagena, Colombia, of the date of the 16th of May, 1824, speaks of three trees found in the forests adjoining to Ysconde and Citarà (or Quibdo, the capital of the Chocò), and known to the inhabitants by the names of "lyria, popa, and sandè," the two former of which yield an agreeable and nutritious milk, corresponding exactly with Humboldt's account of the milk of the palo de vaca, and, like it, employed as an article of sustenance by the poorer inhabitants, although superciliously rejected by the more wealthy, who merely avail themselves of its viscosity to use it as a substitute for birdlime in catching parrots. The sandè, however, which in appearance more closely resembles Humboldt's tree, although it yields its milk in greater profusion, differs materially from it in its general properties, its milk being thinner, of a bluish cast, resembling skimmed milk, and less agreeable to the palate—hence not employed, like the milk of both the lyria and the popa, for the purposes of aliment. This milk, however, notwithstanding its inferiority in this respect, is said to possess properties which fully coun-

terbalance this deficiency, being convertible, by solar inspissation, into a black gum, or extract, which is highly prized for its medicinal virtues, real or imaginary, especially as a topical application in affections of the pleura or spleen. Such, indeed, is the estimation in which it is held, that it sells, in the valley of the Cauca, at the high price of one dollar per ounce, or a doubloon per lb. Mr. Higson regards the tree known in the province of Chocò by the name of lyria as identical with the palo de vaca of the coast of Venezuela. Of the correctness of this opinion we have no data for forming a correct judgment, especially as he enters into no details, and gives no description.

The following particulars respecting the popa are extracted from a portion of Mr. Higson's journal, given in the letter already quoted, and containing the account of his expedition about twelve miles up the river from Ysconde, in company with the alcalde and two other gentlemen, on the 7th of May, 1822, for the purpose of examining this tree (which he observes to have been very abundant in the province of Popayan) in the spot where it grows. This tree, he says, yields an abundance of sweet and aromatic milk, of the consistence of good cream, and so white as to mark any substance upon which it falls with a very durable white stain: it mixes readily either with water or with spirits, and forms with either an agreeable beverage. This milk constitutes, during the season in which it flows most abundantly, the chief subsistence, not only of the Indians and negroes, but also of the jaguars, whom instinct has taught to lacerate the bark with their claws, and catch the delicious fluid as it trickles down. The Indians and negroes obtain it, as Humboldt states, by incisions made in the bark, which Mr. Higson describes as being of considerable thickness, externally of an ash, and internally of a clay-red color. Its nutritive qualities, he observes, are fully proved by the improved condition of all who feed on it during the season: this fully coincides with Humboldt's account. Of this vegetable-milk Mr. Higson and his party drank several calabashes full, and were highly gratified with its taste. They then proceeded to cut down one of the trees, "the loftiest of the forest," as Mr. Higson says, in order to obtain specimens. The timber of this tree he describes as being "white, of a free grain," and well adapted for the manufacture of shingles. It had done blowing; but the blossoms, he was informed, were extremely showy, and if we may judge from his account of the fruit, disposed in axillary racemes, or clusters; the fruit, he says, appeared to be about one month old, and grew in clusters on short footstalks, from the alæ of the leaves: they were scabrous, and of the size of small nutmegs: these he regards as berries, and not drupes—a conjecture which, if well founded, would mark a considerable difference between the tree of Ysconde (which is identical, he says, with that of the forests of the Eska, near Quibdo) and that of Venezuela. Another difference appears to exist in the admixture of a number of abortive fruits with the fertile ones in the branches, which seems to imply that the tree producing



Pericarp and Nut of the Palo de Vaca, or Cow-Tree, of Venezuela, natural size.

ı monœcious, or had distinct male and female flowers growing in the ster. The branches of the tree he describes as uniformly trichoto- divided into threes. The leaves had short footstalks, were coria- arted at the base, emarginate and pointed, covered over with a num- miglobular glands; all which particulars mark a considerable differ- n Humboldt's tree.

aking of the popa, we had nearly forgotten to notice one most valu- perty of its milk, mentioned by Mr. Higson in his letter to Mr. Watts, its forming, when boiled with the gum of the mangle-tree *(sapium um ?)*, tempered with wood-ashes, a valuable glue, which is capable ng the effects of humidity.

'AMARIND-TREE (*Tamarindus* s a native both of the East In- of tropical America, and prob- of Arabia and some parts of Where it is a native it grows ırge tree, and affords excellent heavy, firm, hard, and durable. ı is large, covered with brown l divides into many branches. es are not unlike those of the ı ash, only they are of a brighter d the leaflets are closer to the the leaflets are small, but the n a leaf (sixteen or eighteen ı leaf, with an odd one at the y) gives the tree a very light and elegant appearance. The flowers from the sides of the branches in loose bunches, and are followed ods, of which there are, generally, about five or six in a bunch. The the West India tamarinds are, on an average, about three inches l contain about three seeds: those from the east are about double

Leaf, Flower, and Fruit, of the Tamarind.

ılp in which the seeds of the tamarind are enclosed, contains more any other vegetable substance, in a natural state, with which we ıinted; and, therefore, it is used both for sharpening food and drink, ıedicinal purposes. Niebuhr says: "The tamarind is equally use- greeable. It has a pulp of a vinous taste of which a wholesomer g liquor is prepared; its shade shelters houses from the torrid heat n; and its fine figure greatly adorns the scenery of the country." hing properties have given it a place in poetry:—

> "The damsel from the tamarind-tree
> Had plucked its acid fruit,
> And steeped it in the water long:
> And whoso drank of the cooling draught
> He would not wish for wine."

Islo, an old traveller, says, that as soon as the sun is set, the leaves ımarind close up the fruit to preserve it from the dew, and open as hat luminary appears again:—

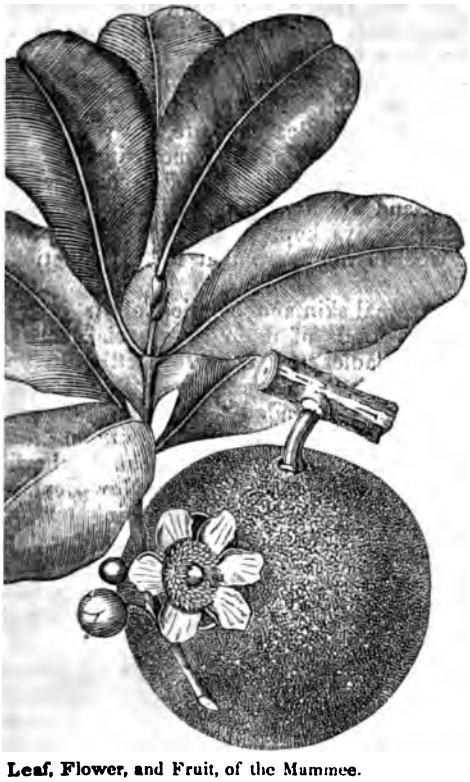
> "'Tis the cool evening hour:
> The tamarind from the dew
> Sheathes its young fruit, yet green."

'ast India tamarinds are preserved without sugar, and, therefore, the best for medicinal use.

:AMMEE-TREE belongs to the family of the *guttiferæ*, the same with

The Tamarind-Tree.

he *mengostan*. It is a native of the West Indies, where it grows to tree—sixty or seventy feet in height. Browne states that it is one of the largest in Jamaica; that it affords excellent timber, and abounds with a resinous gum. It is a handsome, straight-growing tree, with a spreading head; and the leaves are oblong and obtuse, with very many fine, closely set, parallel veins. The fruit of the mammee is yellow, not unlike, either in shape or size, one of the largest russet apples. The outer rind, which easily peels off, is thick and leathery; beneath this is a second very delicate coat, which closely adheres to the pulp, and should be carefully removed before eating the fruit, as it leaves a bitter taste in the mouth, which, though not very strong at first, it is said will continue two or three days. The seeds, of which there are two in the centre, are resinous and very bitter; but the pulp under the nich, when ripe, is of a deep yellow, resembling that of the finest and of considerable consistency—is very fragrant, and has a delit very peculiar flavor. It is eaten either raw and alone, or cut into th wine or sugar, or preserved in syrup. To people with weak s it is said to be more delicious than healthful; but still it is highly and abundant in the West India markets. A liquor called *San Creso* obtained from its flowers in Martinique, by distilling them with The mammee was found by a don in the vicinity of Sierra Leone, ther native there or imported from America, can not be ascertained.



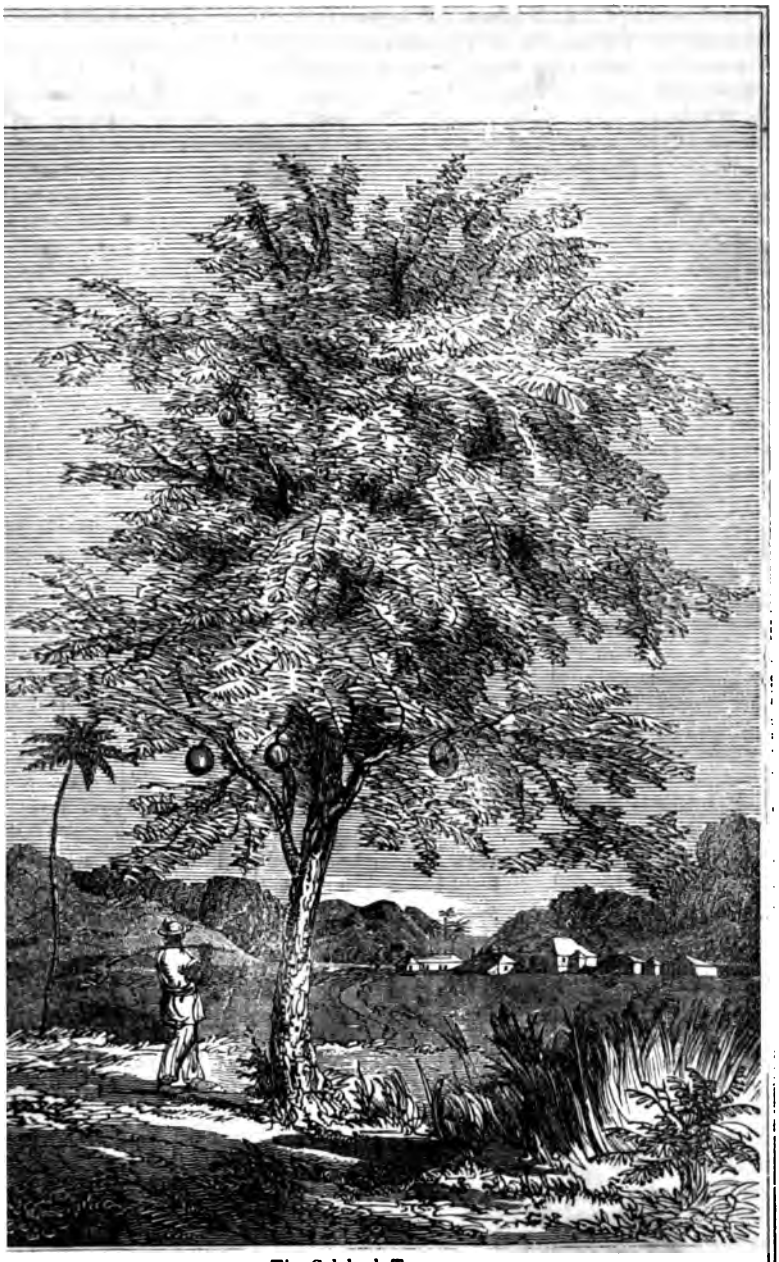
Leaf, Flower, and Fruit, of the Mammee.

CALABASH-TREE.—This tree derives its botanical name (*crescentia* om Pietro Crescentio, an Italian writer on agriculture, who lived he end of the thirteenth century. Its ordinary name is a corruption of *calabaça*, given it by the Spaniards. It is a native of the West nd central America, where it grows to the height of twenty feet, and diameter which has been somewhat indefinitely compared to that uman body. The trunk is crooked, dividing at the top into numerly long, thick, nearly simple, and almost horizontal branches. The e clustered, nine or ten together, at irregular distances, from five to es long; they are about one inch broad, narrowing very gradually he base, and terminating in a long point; and are entire, smooth,

and rather shining. The flowers are single, seated on a thick peduncle arising from the larger branches and sometimes from the trunk: they are of a large size, variegated with red and yellow, and altogether have a beautiful appearance, but a very disagreeable smell. The fruit varies in size and figure on different trees, but may be described as round, oval, or bottle-shaped, from two inches to a foot in diameter, covered with a thin greenish-yellow skin, enclosing a thin, hard, and almost woody shell, which contains a pale yellow, soft, juicy pulp, of an unpleasant taste, but which, as well as the leaves and the juice, is esteemed a valuable remedy in several external and internal disorders. The pulp contains several flat seeds which, being brought over in the ripe fruit, and sown in pots of light, fresh, rich earth, plunged in a bark hot-bed, and always kept in the stove, will produce the plant in this country; but we can not learn that in this situation it ever develops its flowers.

The shell, stripped of its external skin and emptied of its juice, is used, according to its size, for various kinds of domestic vessels, such as water-cans, goblets, coffee-cups, spoons, ladles, and even for kettles to boil water in; for the shell is so hard and close grained as to bear the fire several successive times without injury. When intended for ornamental vessels, they are sometimes highly polished, and have figures engraven upon them, which are variously tinged with indigo and other colors. John Rutherford says that the calabash is the only vessel possessed by the New-Zealanders for holding any kind of liquid; and adds, that when they drink out of it they never permit it to touch their lips, but hold their faces up, and pour the liquor into their mouths. After dinner they place themselves for the purpose in a row, when a slave goes from one to another with the calabash, and each holds his hand under his chin as the liquor is poured by the slave into his mouth.

The Tallow-Tree of China.—The tallow-tree *(croton sebiferum)*, called by the Chinese *oo-kieou*, is of the height and appearance of a pear-tree, with twisted branches and a large rounded head. The trunk is short and thick, and the bark smooth. The leaves are alternate, and resemble those of the black poplar. The blossom is yellow; but the most singular part of this tree is the fruit, which is enclosed in a husk, like that of a chestnut. When the fruit is ripe the husk opens of itself, showing three white grains about the bigness of a filbert. These grains contain the beautiful vegetable tallow so useful to the Chinese. The fruit of the tallow-tree goes through nearly the same process as the seeds of the oil-plant. The machine by which it is bruised differs from that used in the other case for pounding the seed of the oil-plant; but, says Mr. Abel, "it is, no doubt, often used for both purposes." That writer gives an engraving of it. It consists of a wheel moved backward and forward in the trunk of a tree, which is shaped like a canoe, lined with iron, and fixed in the ground. The axis of the wheel is attached to a long pole, which is laden with a heavy weight and suspended from a horizontal beam. The berries, thus bruised and divided, are exposed for a considerable time to the action of steam until they become very soft, when they are quickly thrown upon layers of straw, covered up again with other layers of straw, and spread about as equally as possible. Men do this with their feet; and as the berries are very hot, and of course warily trodden upon, the operation is said to bear a striking resemblance to dancing. The appearance of a number of men gravely and carefully performing sundry evolutions on their toes has been described as irresistibly ludicrous, particularly as it is unaccompanied by music. By this process large cakes are formed of the mingled grains and straw. The cakes thus formed are afterward pressed in the same manner as the



The Calabash-Tree.

bruised seeds of the oil-plant. Pressure is, however, not the only method of obtaining the tallow; for it is sometimes procured by boiling the bruised seed in water and collecting the oily matter that floats on the surface. The tallow is hard and white, and has all the sensible properties of that from animals. Du Halde says that three pounds of vegetable oil are mixed with every ten pounds of the tallow, and that a quantity of wax is used to give it consistence. The best candles are also coated with wax. When properly prepared, they burn almost without smoke, and quite free from disagreeable smell. It does indeed often happen that the candles prepared with vegetable tallow burn with a great flame, throw out much smoke, and consume very quickly; but this must be attributed to a slovenly and dirty mode of preparation, and to the nature of the wick, which is usually made of a dry and light wood, not much unlike the wick of a rush-light. Candles made of this tallow by Europeans have been found very nearly equal to those made of wax.

The tallow-trees are usually planted in extensive plains, and in regular order. The leaves being either of a deep purple or brilliant red, and the blossoms of a bright yellow, the contrast is said to have a very pleasing effect; and European travellers have described the groves of those trees as the most beautiful objects in a Chinese landscape, having a resemblance to extensive flower-gardens.

The Banana.—The banana, or plantain, forms a principal article of food to a great portion of mankind within and near the tropics, offering its produce indifferently to the inhabitants of equinoctial Asia and America, of tropical Africa, and of the islands of the Atlantic and Pacific oceans. Wherever the mean heat of the year exceeds seventy-five degrees of Fahrenheit, the banana is one of the most important and interesting objects for the cultivation of man. All hot countries appear equally to favor the growth of its fruit; and it has even been cultivated in Cuba, in situations where the thermometer descends to forty-five degrees of Fahrenheit.

The tree which bears this useful fruit is of considerable size: it rises with an herbaceous stalk, about five or six inches in diameter at the surface of the ground, but tapering upward to the height of fifteen or twenty feet. The leaves are in a cluster at the top; they are very large, being six feet long and two feet broad: the middle rib is strong, but the rest of the leaf is tender, and apt to be torn by the wind. The leaves grow with great rapidity after the stalk has attained its proper height. The spike of flowers rises from the centre of the leaves to the height of about four feet. At first the flowers are enclosed in a sheath, but, as they come to maturity, they drop off. The fruit is about an inch in diameter, eight or nine inches long, and bent a little on one side. As it ripens it turns yellow; and when ripe, it is filled with a pulp of a luscious sweet taste.

The banana is not known in an uncultivated state. The wildest tribes of South America, who depend upon this fruit for their subsistence, propagate the plant by suckers. Eight or nine months after the sucker has been planted, the banana begins to form its clusters; and the fruit may be collected in the tenth and eleventh months. When the stalk is cut, the fruit of which has ripened, a sprout is put forth, which again bears fruit in three months. The whole labor of cultivation which is required for a plantation of bananas is to cut the stalks laden with ripe fruit, and to give the plants a slight nourishment, once or twice a year, by digging round the roots. A spot of a little more than a thousand square feet will contain from thirty to forty banana-plants. A cluster of bananas, produced on a single plant, often contains from one hundred and sixty to one hundred and eighty fruits, and weighs from seventy to eighty pounds. By reckoning the weight of a cluster only at forty pounds,

The Banana, or Plantain-Tree, with Cocoa-Nut Trees in the Back-Ground.

such a plantation would produce more than four thousand pounds of nutritive substance. M. Humboldt calculates that as thirty-three pounds of wheat and ninety-nine pounds of potatoes require the same space as that in which four thousand pounds of bananas are grown, the produce of bananas is consequently to that of wheat as 132 to 1, and to that of potatoes as 44 to 1.

The facility with which the banana can be cultivated has doubtless contributed to arrest the progress of improvement in tropical regions. In tropical America civilization first commenced on the mountains, in a soil of inferior fertility. Necessity awakens industry, and industry calls forth the intellectual powers of the human race. When these are developed, man does not sit in a cabin, gathering the fruits of his little patch of bananas, asking no greater luxuries, and proposing no higher ends of life than to eat and to sleep. He subdues to his use all the treasures of the earth by his labor and his skill; and he carries his industry forward to its utmost limits, by the consideration that he has active duties to perform. The idleness of the poor Indian keeps him, where he has been for ages, little elevated above the inferior animals: the industry of the European and the North American, under their colder skies, and with a less fertile soil, has surrounded them with all the blessings of society—its comforts, its affections, its virtues, and its intellectual riches.

The Varnish-Tree *(rhus vernix)*.—The beautiful black Japan varnish so much admired with us and in Europe is the production of a tree which grows wild as well in China as Japan. It is cultivated in plantations, and is so much improved by the treatment it receives, that a cultivated tree affords three times more of this valuable product than the wild one. The Chinese call the tree "*tsi shoo:*" it has some resemblance to the ash, with leaves shaped like those of the laurel, of a light-green color and downy feel. It is of no great beauty, but is valuable as the source of a very lucrative manufacture. There is scarcely anything more curious in this tree than the common manner of propagating it, which is neither by seeds nor suckers. Early in spring, a small branch or twig is selected, about a foot and a half or two feet in length, and a ring of bark cut from it all round, about half an inch in breadth. The wound is immediately coated up with smooth soft clay, and a ball of the same clay formed all around it as large as a child's head. This is then covered up with matting to prevent it from falling to pieces, and a vessel of water hung over with a very minute hole in the under part, sufficient to let the water drop slowly upon the ball and to keep it constantly moist. As the water drops from the vessel, it is of course replaced from time to time, and in the course of six months it is found that the wounded edges of the bark have shot forth into the mass of clay, fibre-like roots, which form the more readily as the tree is still supported by the sap from its parent-stock. When the twig is thought to have taken sufficient root in the mass of clay to support an independent existence, it is sawed off from the tree a little below the clay, placed immediately into a hole prepared for the purpose, and becomes at once a tree.

When these trees are seven or eight years old, they are capable of supplying the precious varnish, which is gathered in the following manner: About the middle of summer, a number of laborers proceed to the plantations of these trees, each furnished with a crooked knife and a large number of hollow shells, larger than oyster-shells. With their knives they make many incisions in the bark of the trees about two inches in length, and under each incision they force in the edge of the shell, which easily penetrates the soft bark and remains in the tree. This operation is performed in the evening, as the varnish flows only in the night. The next morning the workmen proceed again to the plantation; each shell is either wholly or partially filled

with varnish: this they scrape out carefully with their knives, depositing it in a vessel which they carry with them, and throw the shells into a basket at the foot of the tree. In the evening the shells are replaced, and the varnish again collected in the morning. This process is repeated throughout the summer, or until the varnish ceases to flow. It is computed that fifty trees, which can be attended by a single workman, will yield a pound of varnish every night. When the gathering is over, the varnish is strained through a thin cloth, loosely suspended over an earthen vessel; and the little impurity that remains in the strainer is used in physic.

There is a corrosive property in the varnish which operates very injuriously to the workmen employed in the preparation of the varnish, if the utmost care and precaution be not taken to obviate its distressing effects; a kind of tetter appears on the face, and in the course of a few days spreads over the whole body; the skin becomes red and painful, the head swells, and the whole surface of the body is covered with troublesome sores.

To prevent these effects the workmen rub their bodies well with prepared oil before they proceed to their work; they wash themselves with a decoction of herbs and bark, and prepare themselves by a course of medicine. In addition to these precautions, they wrap their heads in linen veils whenever they are at work, leaving only two holes for their eyes; and also cover themselves with a close dress of leather, and wear long gloves reaching above the elbows: by these means they are enabled to escape the diseases generated by the noxious properties of the varnish-tree. It is not improbable that an exaggerated version of these precautions may have given the first idea of the fable of the dreadful upas or poison-tree of Java, with which the Dutch writers of the last century amused or horrified their readers.

It is said that there are men that will handle this varnish-tree or touch the juice with impunity, while others are dreadfully affected even by being in the way of the smoke, or the wind which carries the effluvia of the tree. The artisans who employ this varnish can only work in the dry season when the north wind blows. The varnish is brought to market in great tubs; its natural color is white, and it looks like cream, but it blackens in the air. Dampier says they make in Tonquin the best glue in the world from it.

Another tree very useful to the Chinese artisans is the *kou-chou*, which resembles a fig-tree. This tree on incision yields a milk, or liquid gum, which they use in gilding with leaf-gold. They wet their pencils in it, and then draw their figures and ornaments with the gum upon the wood, over which they apply the leaf-gold, which is so firmly cemented by the gum, that it never detaches. This gum in its effects is like the transferring varnish now used in Europe and America, but more tenacious.

The Bamboo.—Although no production of China is of so much importance to us as tea, there are others of equal or perhaps superior value to the Chinese themselves, and the bamboo may be classed among them. In the hands of the Chinese, the bamboo may almost be denominated a universal material, for they perform with it operations the most various and dissimilar that can well be imagined. This reed, in its entire state, is formed into stools, chairs, tables, bedsteads, and many other articles of furniture. It supplies scaffolding for building, masts and yards for shipping, carts and wheelbarrows for husbandry, wheels and tubes for irrigation. Split into laths, or beaten into fibres, it forms screens for ornament, and ropes, cords, and twine, for all purposes, from the rigging of a ship to the wick of a candle. Woven, it becomes a sail-cloth or a sacking; macerated into a pulp, it is made into paper; and mixed up with lime, it serves to calk their ships. By simply tying together four of these reeds, swimming-jackets are constructed capable of sup-

The Bamboo.

port. ; one or more persons, and a machine is thus made for the prevention of drowning, equally efficacious with our more elaborate life-preservers. When young, the bamboo affords a nutritious article of diet; when growing, it is a fence for their gardens and fields, a protection for their cottages, and an ornament for their palaces. It is the weapon of justice and the instrument of oppression, supporting equally the authority of the mandarin and the arrogance of the petty official. It almost seems that, without its use, the machinery of government would stand still, and the Chinese would want many of those accessories to comfort which separate the civilized man from the savage.

The Camphor-Tree.—One of the useful and magnificent productions of the vegetable kingdom that enriches China, and more particularly the provinces of Kiang-si and Canton, is the *laurus camphora*, or camphor-tree. This stupendous laurel, which often adorns the banks of the rivers, was in several places found by Lord Amherst's embassy above fifty feet high, with its stem twenty feet in circumference, and with branches not less than nine feet in circumference. The Chinese themselves affirm that it sometimes attains the height of more than three hundred feet, and a circumference greater than the extended arms of twenty men could embrace. Camphor is obtained from the branches by steeping them, while fresh cut, in water for two or three days, and then boiling them till the gum, in the form of a white jelly, adheres to a stick which is used in constantly stirring the branches.

The fluid is then poured into a glazed vessel, where it concretes in a few hours. To purify it, the Chinese take a quantity of finely-powdered earth which they lay at the bottom of a copper basin; over this they place a layer of camphor, and then another layer of earth, and so on until the vessel is

nearly filled, the last or topmost layer being of earth. They cover this last layer with the leaves of a plant called po-ho, which seems to be a species of mentha. They now invert a second basin over the first, and make it air-tight by luting. The whole is submitted to the action of a regulated fire for a certain length of time, and then left to cool. On separating the vessels the camphor is found to have sublimed, and to have adhered to the upper basin. Repetitions of the same process complete its refinement. Besides yielding this valuable ingredient, the camphor tree is one of the principal timber-trees of China, and is used not only in building but in most articles of furniture. The wood is dry and of a light color; and, although light and easy to work, is durable and not liable to be injured by insects.

The Camphor-Tree.

THE OIL-PLANT.—The *camellia oleifera*, called by the Chinese the *tcha-yeou*, or "the oil-bearing tea-plant," has the same habitats and grows in precisely the same soil as the tea-plant, and resembles it in most of its botanical characters. It produces much of the oil used by the Chinese, which is described as pure and esculent. It is cultivated in large plantations, and seems to flourish best in a red sandy soil, where, except the tea, few other plants will grow. This beautiful shrub is sometimes as large as a moderate-sized cherry-tree, and seldom less than six or eight feet high. It bears a profusion of blossoms, which are large, single, and purely white, and give at a distance the appearance of a grove lightly covered with snow. The oil is contained in the seeds of the plant, and it may be remarked that the seeds of the tea-plant also yield oil; nor, according to some writers, is this the only resemblance in the useful properties of the two plants. Mr. Clarke Abel concludes that the leaves of the camellia, having undergone the same preparation as the leaves of the tea-plant, are used by the Chinese as tea; and Kæmpfer asserts that a species of the camellia is used in Japan with tea, to which it gives a high flavor. The mode of cultivation is supposed to be the same with both plants, and where the tea-plant might be introduced, there also would the camellia flourish.

The simple process by which the oil is extracted from the seed, is thus described by Mr. Clarke Abel: "The seeds are first reduced to a coarse powder by one of several methods. Sometimes they are pounded in a large mortar by a weight at the end of a lever, acted upon by the cogs of a water-wheel. At others, they are crushed by a horizontal wheel, having small perpendicular wheels shod with iron fixed to its circumference, and acting in a groove lined with the same metal. When sufficiently ground, they are

put into bags and boiled, or rather stewed a short time, and are then transferred to the press, where they yield the oil. The press is of very rude construction: it consists of the hollowed trunk of a tree, open at one end, and having two square holes mortised in its sides, opposite each other. It is so supported that the upper end is higher than the other. When the oil is to be expressed, one of the bags is put into the trunk and pushed back to its depressed end. Semicircular pieces of wood are then introduced through the mortises, and, meeting, form a circle, which is equal to the circumference of the hollow. Several of these are successively introduced, and fill up the interval between the bag and the mortises, and some space beyond. They are then driven back with great force upon the end, by the means of bars and wedges of wood, forced in by an immense hammer in the form of a battering-ram. The oil runs from the press through a small opening in its depressed end.

The Allspice-Tree.—The tree that produces the condiment which we call allspice, is a West India species of myrtle, which is also called the pimento. It grows to the height of from twenty to thirty feet, and has somewhat oval leaves, of a deep shining green color, and numerous branches of small white flowers, each with four white petals. The thick and dark-green foliage, relieved by an exuberance of white and richly-aromatic flowers, renders its appearance very striking; and there is scarcely in the vegetable world any tree more beautiful than a young pimento-tree about the month of July. That, with the preceding and following months, forms the period of its being in flower, the commencement of which varies with the local situation of the tree and the difference of the season for rain. After it flowers the fruit soon ripens, and it is observed that this takes place the soonest in clear open grounds.

The pimento-trees grow spontaneously and in great abundance, and in great abundance, in many parts of Jamaica, particularly on the northern side of that island, in elevated spots near the coast; but they can not be propagated without great difficulty. The usual method of making a new pimento walk, or plantation, is to appropriate for this purpose a piece of woody ground in the neighborhood of an already existing plantation, or in a part of the country where the scattered trees are found in a native state. All other trees are then cut down, but the timber is allowed to remain and decay where it falls. In a year or two young pimento plants are found to spring up in all parts of the land, supposed to have been produced from berries dropped there by birds, which eagerly devour them. The tree begins to bear fruit in three years after it is planted, but it does not arrive at maturity until seven. At that age it often yields its fruit at the rate of one thousand pounds weight from an acre; and, in favorable seasons, a single tree has been known to yield one hundred and fifty pounds of the raw fruit, or one hundred weight of the dried spice; there being, commonly, a loss of one third in curing.

About the month of September, and not long after the blossoms have fallen, the berries are in a fit state to be gathered. They are not then, indeed, quite ripe, but they have attained their full size, which is generally about that of a peppercorn. They are gathered by the hand, and one laborer in a tree will strip them off so quickly as to employ three below in picking them up; and an industrious picker will fill a bag of seventy pounds' weight in a day. After they have been carefully cleared of leaves, small twigs, and ripe berries, they are spread thinly on cloths, laid over terraced floors, raised a little above the ground, enclosed with an upright ledge of eight or ten inches in height, and divided by transverse partitions into four or more

Pimento, or Allspice-Tree.

square compartments, that each may contain a day's gathering. During the first and second days they are turned often, that the whole may be more exposed to the sun; but when they begin to dry they are frequently winnowed and laid in cloths to preserve them better from rain and dews, still exposing them to the sun every day, and removing them under cover every evening, until they are sufficiently dried. The drying process, which usually takes about twelve days, changes the green color to a deep reddish-brown, by which, and the rattling of the seeds within the berries, the operation is known to be completed; they are then packed in bags or hogsheads for the market. When the berry is allowed to become quite ripe it is of a dark-purple color, and filled with a sweet pulp.

In its smell and flavor pimento is thought to resemble a mixture of cinnamon, nutmegs, and cloves, whence it obtained the name of *all-spice*. Its use in cookery is well known. It is also employed in medicine as an agreeable aromatic, and it forms the basis of a distilled water, a spirit, and an essential oil. When the leaves of the pimento are bruised they emit a fine aromatic odor, as powerful as that of the fruit; and, by distillation, they yield an odoriferous oil, which is not unfrequently used in medicinal preparations instead of the oil of cloves. The tree was introduced into Europe in the early part of the last century, but the fruit does not ripen. It is delicate and difficult to manage; requiring, at the same time, warmth and a great deal of air.

The Egyptian Lotus.—Herodotus mentions the lotus in the following terms: "The Egyptians, who live in the marshy grounds, make use of the following expedient to procure themselves more easily the means of subsistence. When the waters have risen to their extreme height, and all their fields are overflowed, there appears above the surface an immense quantity of plants of the lily species, which the Egyptians call the lotos, and which they cut down and dry in the sun. The seed of the flower which resembles that of the poppy, they bake, and make into a kind of bread; they also eat the root of this plant, which is round, of an agreeable flavor, and about the size of an apple. This plant is also described by Theophrastus: "The lotus of Egypt grows in the inundated fields. Its flowers are white, and their petals are like those of the lily. They grow close to one another in great numbers. The flowers close at the setting of the sun, and sink below the water; but when the sun rises they again open and reappear. This they do daily until the fruit is completely formed and the flower has fallen. The fruit is equal to that of a large poppy, and contains a large number of grains resembling those of millet." It is singular that neither of these ancient authors ascribe a sacred character to the plant, but we learn from later sources that it denoted fertility, and was consecrated to Isis and Osiris as an emblem of the creation of the world from water; and was also considered emblematic of the rising of the Nile and the return of the sun. This account is confirmed by the frequency of its occurrence in the bas-reliefs and paintings in the Egyptian temples, in all representations of sacrifices, religious ceremonies, &c., and in tombs, and whatever is connected with death and another life. One class of writers in their anxiety to show that the religion and arts of Egypt were derived from India, were formerly disposed to contend that the true lotus described by Herodotus and Theophrastus was the Indian cyamus, which had been introduced into Egypt, together with the superstitions connected with it, but had since become quite extinct in that country; and this position they confirmed, by asserting that the lotus represented in the Egyptian sculptures was not the Egyptian *nymphæa*, but the Indian *cyamus*. But it will be perceived that these old Greek writers refer

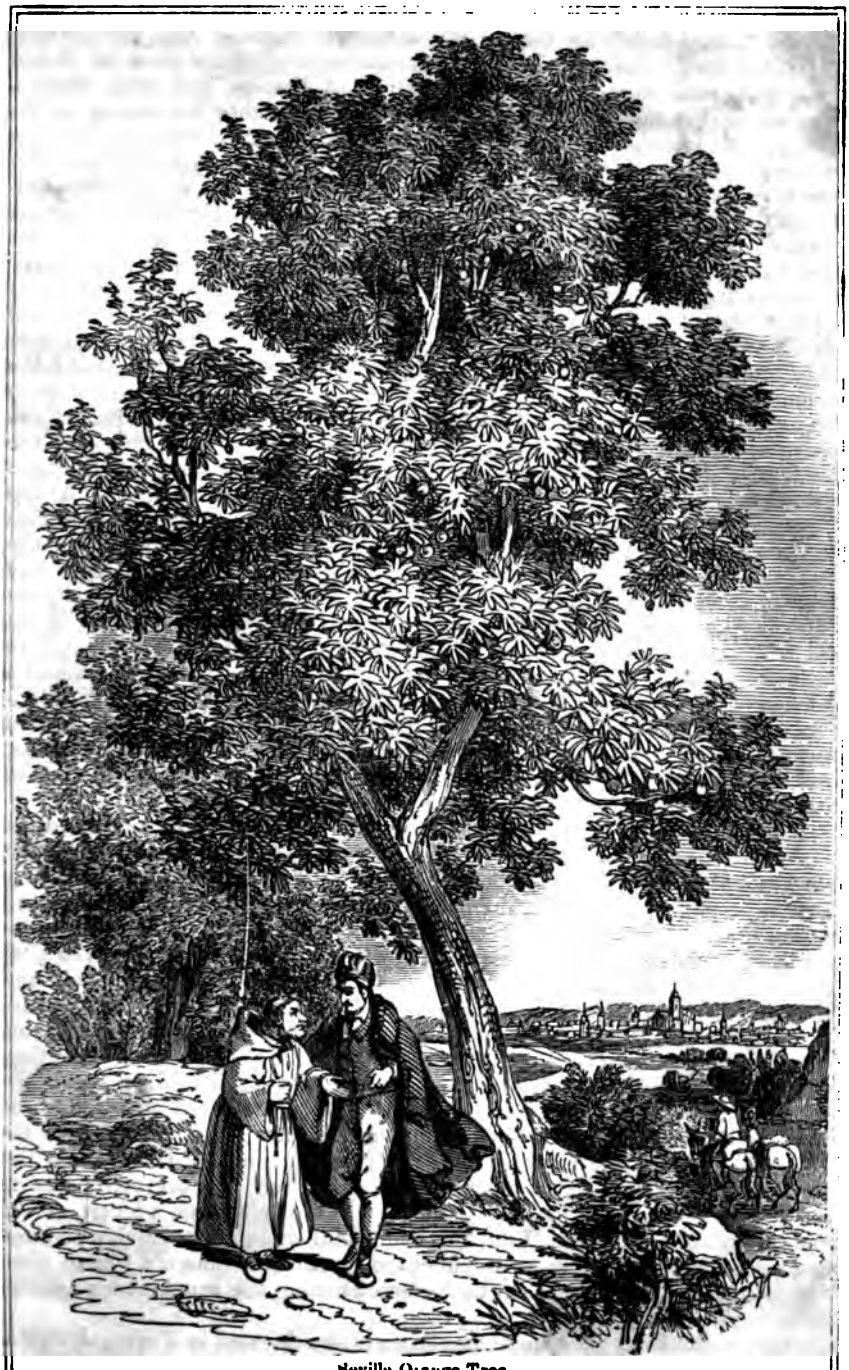
The Egyptian Lotus.

to the plant which they describe as one which is common; and M. Delille states in the great work, the "Description de l'Egypte," that the Egyptian lotus agrees as nearly as could be expected with the description of Herodotus and Theophrastus; and that the *nymphæa cærulea*, or blue lotus of Egypt, is that which is more frequently than *any other* plant sculptured and painted in the Egyptian temples.

Our engraving represents the Egyptian lotus (*nymphæa lotus*), and the blue lotus (*nymphæa cærulea*), grouped from the work just mentioned, from which we also obtain the following description of the white species, from which the other is chiefly distinguished by the blue color of its flower: "It grows in the ditches and canals of Lower Egypt, and varies in size according to the depth of the water. The root is nearly a globular tubercle, about fifteen lines thick (more than an inch and a quarter), and covered with a dry, brown, and leathery skin. The leaf-stalks are cylindrical, about as large as the little finger, and garnished with five prickles: the length is proportionable to the depth of the water; short in rice-fields and low, marshy places, but sometimes five feet long in the lakes and canals. The leaf, which approaches to a circular shape, with short semi-lunar indentations around the circumference, varies from six inches to a foot in breadth. The calyx consists of four oval leaves, green below, but ruddy at the edges. The blossom consists of from sixteen to twenty petals, which only differ from the leaves of the calyx in being of a white color, and a little longer in shape. The centre of the flower is occupied by a half-globular ovary, to which adhere the leaves of the calyx, and the petals disposed in several ranks. The stamens, which are more numerous than the petals, are inserted in the same manner around the ovary; they are straight, and half as long as the petals, those nearest to the petals being the largest. The ovary is crowned by a flat stigma, divided into twenty or thirty rays. The fruit is round, hollow, soft, and pulpy, and covered with scales, which are the remains of the different parts of the flower. The divisions of this capsule correspond in number with the rays of the stigma, and form so many cells, each of which contains a large number of small, round, and mealy seeds."

At the present day the Egyptians make little use of either the white or blue species of the lotus. They esteem the latter most on account of its beautiful flower, which the ancient Egyptians used to make into crowns. The local name for both is *naufar*; and the white is distinguished as the "naufar of the hogs," and the blue as the "naufar of the Arabs."

The Orange-Tree.—The citron family of plants comprehends four distinct species: the citron, the lemon, the orange, and the shaddock; and the orange and lemon have many varieties. Even in the east, where they are native, they are not a little capricious in their growth, the fruit and even the leaves frequently altering, so that it is not easy to say which is a distinct species and which a variety. They continue flowering during nearly all the summer, and the fruit takes two years to come to maturity, so that for a considerable period of each year, a healthy tree exhibits every stage of the production, from the flower-bud, to the ripe fruit, in perfection at the same time. They are all either small trees or shrubs, with brown stems, green twigs and leaves, bearing some resemblance to those of the laurel. We can not, however, judge of the size of the orange-tree from the specimens we ordinarily see in this country. In parts of Spain there are some old orange-trees forming large timber; in the convent of St. Sabina at Rome, there is an orange-tree thirty-one feet high, which is said to be six hundred years old, and at Nice, in 1789, there was an orange-tree which generally bore 5,000 or 6,000 oranges, and was fifty feet high, with a trunk requiring two



Seville Orange Tree.

men to embrace it. The size depends much upon the age of the plant. All the citron family are natives of the warmer parts of Asia, though they have been long introduced into the West Indies, the tropical parts of America, the Atlantic isles, the warmer countries of Europe, and even Britain. The orange is a taller and more beautiful tree than either the citron or the lemon, but like them has prickly branches in its native country. It was originally brought from India. Whether it was originally a Chinese fruit seems doubtful, as it is not mentioned by Marco Polo, who is so circumstantial in describing all the productions of that country. Yet the Portuguese found it there, and John Bell was told by one of the missionaries that the tree was still standing at Canton, from which the seed was taken by the missionaries and sent to Portugal. The first distinct mention of the orange is by the Arabs. It is noticed by Avicenna, and Galessio (in whose "Traité du Citrus," published at Paris in 1811, the history of this fruit was first carefully traced) states that, when the Arabs penetrated to India, they found the orange tribe there further in the interior than Alexander had advanced. They brought them thence by two routes; the sweet ones, now called China oranges, through Persia to Syria, and thence to the shores of Italy and the south of France, and the bitter oranges, called in the commerce of England Seville oranges, by Arabia, Egypt, and the north of Africa, to Spain. At the time that the people of Europe first visited the Levant in great numbers, that is, during the crusades for the delivery of Syria from the dominion of the Saracens, oranges were found to be abundant in that country. Though they were in reality cultivated trees, their number, and the beauty and excellence of their fruit, naturally caused the adventurers (who were not very conversant with natural history, and not a little prone to romance and credulity) to believe and state that these were indigenous to the country, and formed a portion of the glories of the "Holy Land." The fables of the profane writers, and the ambiguity of the description of vegetables in holy writ, helped further to confirm this opinion. As the oranges were of the form of apples, and the color of gold, it did not require much stretch of the imagination to make them the golden apples of the garden of Hesperides.

There is certainly no evidence to show that the orange was known to the ancients either in Europe or Syria; but there is much to demonstrate that we are indebted for the first knowledge of it to the Arabs, who, with their zeal to propagate the religion of the Koran, were also anxious to extend the advantages of agriculture and medicine. The sweet orange which they introduced, was not, strictly speaking, that which has since been called the China orange, and which under that name has been introduced into Spain and Portugal, as well as St. Michael's, and other Atlantic isles, and the West Indies; but rather the orange which was known in Italy before Vasco de Gama doubled the cape of Good Hope. When the Portuguese reached India they found the orange there, and also in China, which was visited for the first time by sea in the early part of the sixteenth century. Although the oranges of St Michael's in the Azores, are now the best that are to be met with in the European market, they are not indigenous productions of that island; but were sent there by the Portuguese, as the same fruit was originally sent to the American continent by the Spaniards. In the middle of a forest, on the banks of the Rio Cedeno, Humboldt found wild orange-trees laden with large and sweet fruit. They were probably the remains of some old Indian plantations; for the orange can not be reckoned among the spontaneous productions of the New World.

Many varieties of the orange family are now cultivated in Portugal, Spain, France, Italy, and Greece. In the first two countries they especially abound

—in Algarve, and in the fine plains of Andalusia, on the banks of the Guadalquivir. The latter is the place from which the bitter or Sevillo oranges are chiefly obtained. In Algarve and Andalusia the orange-trees are of great size. Extensive orchards of them have formed the principal revenue of the monks for several centuries; and in the latter province, the craggy mountains of which are covered with gardens, and vineyards, and forests, abounding in fruit, the flowers of the orange fill the air with their perfume, and lead the imagination back to those days which the Moorish historians and poets delight in describing, when the land which they conquered was adorned with all the refinements of their taste and intelligence, and the luxuries of the east were naturalized in the most delicious regions of the west. In Cordova, the seat of Moorish grandeur and luxury, there are orange trees still remaining, which are considered to be 600 or 700 years old; the trunks of these old trees have begun to decay, and when they get diseased they are covered with a kind of lichen which is supposed to be peculiar to the orange.

The precise time at which the orange was introduced into England, is not known with certainty, but probably it may have taken place not long after its introduction into Portugal, which was in the early part of the sixteenth century. The first oranges, it has been stated, were imported into England by Sir Walter Raleigh, and it is said that Sir Francis Carew, who married the niece of Sir Walter, planted their seeds, and they produced the orange-trees at Beddington, in Surrey, of which Bishop Gibson, in his additions to Camden's Britannia, speaks of as having been there a hundred years previous to 1659. As these trees always produced fruit, they could not have been raised from seeds; but they may have been brought from Portugal or from Italy as early as the close of the sixteenth century. The trees at Beddington were planted in the open ground, with a movable cover to screen them from the inclemency of the winter months. In the beginning of the eighteenth century they had attained the height of eighteen feet, and the stems were about nine inches in diameter; while the spread of the largest of the number was twelve feet one way and nine the other. There had always been a wall on the north side of them, to screen them from the cold in that quarter; but they were at such a distance from the wall as to have room to spread, with plenty of air and light. In 1738 they were surrounded by a permanent enclosure like a greenhouse. They were all destroyed by the great frost of the following winter; but whether this was owing wholly to the frost, or partly to the confinement and damp of the permanent enclosure, can not now be ascertained. At Hampton court there are many orange-trees, some of which are said to be 300 years old. They are generally moved into the open air about the middle of June, when the perfume of their blossoms is most delicious. Orange and lemon trees have been cultivated in the open air in England. For a hundred years, in a few gardens of the south of Devonshire, they have been seen trained as peach-trees are against walls, and sheltered only with mats of straw during the winter.

The orange, naturally produced in warmer climates than our own, has been rendered our property by commerce in a remarkable degree. It may be procured at little more cost than the commonest domestic fruits; while it is perhaps the most refreshing and healthy of all the fruits of warm countries. It has thus become a peculiar blessing to us, for while it offers a gratification within the reach of the poorest, it is so superior to other fruits, that it can not be despised for its cheapness, even by the richest.

The Cashew-Nut Tree.—The only species yet known, the *occidentale*, grows naturally in the West Indies, twenty feet high, and is preserved in this country with the greatest difficulty. The fruit is as large as an orange,

full of an acid juice, frequently used in making punch. To its apex grows a nut, like a hare's kidney, largest at the end next the fruit. (See engraving on page 238.) The shell is very hard, and the kernel is sweet and pleasant, and covered with a thin film. Between the two layers, or tables, which compose the shell, is lodged a dark inflammable oil, so caustic in the fresh nut, that if the lips touch it, blisters immediately follow.

This caustic oil is employed in the West Indies, by young ladies, to renovate their complexions; they suffer some pain in its application, and submit to nearly a fortnight's confinement, after which their new skin looks as fair as that of a new-born child.

This plant is easily raised from the nuts, each planted in a separate pot of light sandy earth, and plunged into a good hot-bed, and kept from moisture till the plants come up. If the nuts are fresh, the plants will come up in a month, and in two months more will be four or five inches high, with large leaves.

The Butter-Tree is of a moderate size, with long alternate leaves, and produces a fruit about the size of a walnut, and of an aromatic smell. Within the fruit is a stone containing a kernel the size of an acorn. According to Mungo Park, the celebrated traveller, it ranks among the first of African vegetables in point of utility. When Park reached a certain district in the interior of Africa, he found the people busily employed in collecting the fruit of the shea-trees, from which they prepare the vegetable butter. The trees grow in great abundance in the part of Bambara through which he was then travelling. "The tree itself," says he, "resembles the American oak; and the fruit (from the kernel of which, being first dried in the sun, the butter is prepared by boiling the kernel in water) has somewhat the appearance of a Spanish olive. The kernel is enveloped in a sweet pulp, under a thin green rind; and the butter produced from it, besides the advantage of its keeping the whole year without salt, is whiter, firmer, and, to my palate, of a richer flavor, than the best butter I ever tasted made from cows' milk."

The Fountain-Tree grows in the Canary islands, and distils water from its leaves so plentifully as to answer all the purposes of the inhabitants who live near it. "There are," says Glasse, "only three fountains of water in the whole island of Hierro, wherein the fountain-tree grows. One of these fountains is called *Acof*, which, in the language of the ancient inhabitants, signifies river; a name, however, which does not seem to have been given it on account of its yielding much water, for in that respect it hardly deserves the name of a fountain. To the northward is another, called *Hapio;* and in the middle of the island is a spring yielding a pure stream. This was discovered in 1565, and is called the fountain of *Hernandez*. On account of the scarcity of water, the sheep, goats, and swine, here do not drink in the summer, but are taught to dig up the roots of fern, and chew them to quench their thirst. The great cattle are watered at these fountains, and at a place where water distils from the leaves of a tree."

Trees yielding water, however, are not peculiar to the island of Hierro; for travellers inform us of one of the same kind on the island of St. Thomas, in the bight or gulf of Guinea; and in Cockburn's voyages we find an account of a dropping-tree, near the mountains of Fera Paz, in South America.

The Upas-Tree.—We fancy there are but few of our readers whose imaginations, at least in childhood, have not been delighted, yet terrified by the popular account of that most wonderful tree called the upas. The fabulous account of this tree was probably first introduced by some Dutch soldiers or seamen into Europe, where it was long current and received with greater or less faith; but the story rested upon no better authority, till one Foersch,

ı year 1783, published a detailed description of the upas, which
ı confirmed all the wonderful things that had been told of it.
5, his description was inserted in a respectable English periodical
ı "London Magazine," with implicit faith, and this article contin-
ı the source whence our instructors of children chiefly drew their
on. Though the whole story may be fresh in the memory of the
of this work, we will briefly mention its principal points, to show
bear on the real existence and nature of a poison-tree that is ac-
ınd growing in Java, and what an imposing fabric of fiction has been
the simple groundwork of truth.

h, who had been only third surgeon to the Dutch forces at Samar-
ttlement on the coast of Java, says, that in 1775–'76, having attained
ık of principal surgeon, he determined to travel into the interior of
l, which, he says, had been little visited by Europeans. One of his
as to obtain accurate information concerning the tree called by the
tives of the island "bohun-upas," of which he had heard and read
vellous things, *as shook his faith, till a strict inquiry convinced him*
or of his incredulity. It was after his return from these travels,
rew up his account of the tree, which he introduces with this assu-
I will relate only simple and unadorned facts, of which I have been
tness—the reader, therefore, may depend on the accuracy of my

ling to this account, the dreadful poison-tree was situated at the dis-
twenty seven leagues from Batavia, and only fourteen leagues from
ıarta, the place of the emperor's residence. It grew in a deep val-
ıly surrounded by barren mountains. Being determined to go as
ıe fatal spot as safety permitted, and having obtained the emperor's
or so doing, Foersch set off and travelled entirely round the moun-
enclosed the upas valley, *keeping always at the distance of eighteen*
n its centre—an operation which we can account for only by sup-
m endowed with mathematical instinct, for he did not know where
ı of the valley was!

rt, a Malay priest had furnished him with a letter of introduction to
Malay priest, considerately placed by the emperor to prepare the
he criminals who were sent to gather the poison of the tree. This
ıriest, he says, lived at a place fifteen or sixteen miles from the tree,
very kind and communicative. He informed Foersch that he had
ıl office for thirty years, during which time he had despatched seven
ndividuals to the upas, of whom not two in twenty had returned,
ious surgeon had, of course, learned before, that only criminals who
red capital punishment were sent on this most perilous errand.

the victims of justice, the story continues, have chosen this lot, they
ally instructed how to proceed with the greater chance of safety,
dually presented with a silver or tortoiseshell box, in which they
ıosite the poison. They then put on their best clothes, and journey,
ied by their friends and relatives, as far as the residence of the
ıere that holy man furnishes each of them with a pair of leather
ıd a long leather cap which descends as far as the breast, having
ıles with glasses, to permit the wearer to see. When thus accou-
priest repeats the instructions for the journey, and after taking
their weeping friends, the criminals ascend a particular mountain
ıt to them, then descend on the other side, where they meet a riv-
ıe course they are to follow, as it will guide them to the tree.

ı asserts that he was present at one of these melancholy departures

from the old priest's house, and had such close communication with the victims, that he gave them some silken cords wherewith to measure the tree, and earnestly requested them to bring him back some piece of the wood, or a small branch, or a few leaves of the upas. He obtained, however, only two dry leaves, with the scanty information that the tree was one of middling size, with five or six young ones of the same kind growing close by it. A continual exhalation (according to the few who returned) issued from the tree, and was seen to rise and spread in the air "like the putrid steam of a marshy cavern." Whatever this vapor or the miasmata from it touched, it killed; and as they had cursed that spot for centuries, not a tree, save the upas and its progeny—not a bush, nor a blade of grass, was found in the valley nor on the surrounding mountains, for a circuit of many miles. All animal life was equally extinct—there was not a bird of the air to be seen—not a rat, nor a mouse, nor even any of those reptiles that swarm in foul places. In the neighborhood of the tree the barren ground was covered with dead bodies and skeletons—the remains of preceding criminals. This was the only circumstance that showed animate beings had ever been there: and as the birds and beasts of prey and the consuming worms could not batten in that valley of death, those ghastly relics would long remain unconsumed to warn every new-comer of his all but inevitable fate.

After many minor details of the wonderful effects of the tree upon the spot where it grows, Foersch proceeds to inform his readers that the poison used artificially by the people of Java, is the gum of the upas mixed up with citron water, &c., and goes on to describe its lightning-like rapidity of effect in this form. He says he was present at the execution of thirteen women of the palace, convicted of infidelity to the emperor's bed—that these victims, being slightly wounded by a kritz, or Malayan dagger, whose point had been dipped in the poison, instantaneously suffered the greatest agonies, and were all dead within sixteen minutes. He is positive as to the number of minutes, for, says he, "I held my watch in my hand all the time." He adds, that a fortnight after he saw seven Malayans executed in the same way.

The statements of this person were at length met with positive contradictions by a Dutchman named Lambert Nolst. This gentleman, a physician and member of the Batavian experimental society at Rotterdam, on the authority of one John Matthew, who had resided twenty-three years in the island of Java, and had been there at the time when Foersch pretended to have made his wonderful observations, most indisputably proved Foersch's story of the upas-tree to be a barefaced forgery.

Not long after Foersch's fabrication, a Swedish naturalist, whose name has been Latinized into Æjmelœus, in an inaugural discourse read at the University of Upsal, gave an account of the bohun-upas, or poison-tree of Macassar. He says this tree grows in many of the warmer parts of India, as Java, Sumatra, Bali, Macassar, and Celebes. That there are two species of it, male and female. That its trunk is thick, its branches spreading, its bark dark brown; its wood solid, pale yellow, variegated with black spots, and its fructification as yet unknown. The wild fancies of Foersch find no place in this discourse, but the tree whose poison had been found so dangerous, was still an object of wonder and awe; and as the honest naturalist did not pretend like his predecessor to speak in all things as an eyewitness, a little lingering exaggeration may be excused in him.

At length, during the English occupation of Batavia, we obtained a correct description of the poison-tree of Java, which, in all likelihood, is the same as that found growing in Macassar and other places in the Indian seas. This description was furnished by Dr Horsfield, and will be found, with all its sci-

The Upas-Tree.

entific detail, in vol. viii. of Batavian transactions, or, as quoted in a note, in Sir Stamford Raffles's splendid work on Java. We merely abridge the doctor's account, begging our readers to remember the particulars hitherto mentioned. Our author says, that though Foersch committed an extravagant forgery, yet the existence of a tree in Java, from the sap of which a fatal poison is prepared, is a fact. This tree is the "Anchar," which grows in greatest abundance at the eastern extremity of the island. It belongs to the twenty-first class of Linnæus, or the Monœcia. The male and female flowers are produced on the same branch, at no great distance from each other; the females being in general above the males. The seed-vessel is an oblong drupe, covered with the calyx; the seed, an ovate nut with cell. The top of the stem sends off a few stout branches, which spreading nearly horizontally with several irregular curves, divide into smaller branches, and form an hemispherical, not very regular crown. The stem is cylindrical, perpendicular, and rises completely naked to the height of sixty or seventy or even eighty feet; near the surface of the ground it spreads obliquely like many of our large forest-trees. The bark is whitish, slightly bursting into longitudinal furrows. Near the ground, this bark is, in old trees, more than half an inch thick, and when wounded yields copiously the milky juice from which the poison is prepared. This juice, or sap, is yellowish, rather frothy, and when exposed to air, its surface becomes brown. In consistence it is much like milk, but thicker and more viscid.

The sap is contained in the true bark or cortex. The inner bark (liber) is a close, fibrous texture, like that of the paper mulberry-tree, called *morus papyfera;* and when separated from the other bark and cleansed, resembles coarse linen. It has been worked into strong ropes, and that from young trees is often converted by poor people into a coarse stuff which they wear while working in the fields. If wetted by rain, however, this flimsy covering affects the wearer with an intolerable itching. Although this curious property of the prepared inner bark is known wherever the tree grows, yet the preparation of poison from its sap is a secret exclusively possessed by the inhabitants of the eastern extremity of Java.

In making his numerous experiments on the tree, Dr. Horsfield had some difficulty with his native laborers, who feared a cutaneous eruption, but nothing more. Now, we may mention here, that this eruption, and other symptoms, are produced by the well-known Chinese varnish-tree, whose sap, like that of this poison-tree, is procured by making incisions in the trunk.

The anchar is one of the largest trees in Java; it delights in a fertile, not very elevated soil, and is found only in the midst of the largest forests! "It is," says Dr. Horsfield, "on all sides surrounded by shrubs and plants, and in no instance with barren desert." The largest specimen he saw was so embosomed in common trees and shrubs, that he could hardly approach it; wild vines, and other climbing shrubs, in complete health, adhered to it, and ascended half the height of its stem. While he was collecting its sap, he observed several young trees that had sprung up spontaneously from seeds dropped by the parent plant.

Dr. Horsfield also describes the preparation of the poison, as the process was performed for him by an old Javan, who was famed for his skill in the art. The poison thus made seems to affect quadrupeds with nearly equal force, proportionate in some degree to their size and disposition. It is fatal to dogs in an hour, to mice in ten minutes, to monkeys in seven, to cats in fifteen minutes, while a poor buffalo subjected to the experiment, was two hours and ten minutes in dying.

Rumphius, the naturalist, saw the effects of the poison on human beings.

hen, in 1650, the Dutch in Amboyna were attacked by the Macassars, who sed arrows dipped in this or some very similar preparation. "The poison," ays he, "touching the warm blood, is instantly carried through the whole ody, so that it may be felt in all the veins, and causes an excessive burning, articularly in the head, which is followed by sickness and death." After it ad thus proved fatal to many Dutch soldiers, who trembled at its name, and o doubt were the first to exaggerate the horrors of the tree that produced t, they discovered an almost infallible remedy in a root—the radix toxicaria of Rumphius—which, if timely applied, counteracted by its violent emetic effect the force of the poison.

The Nutmeg-Tree (see engraving, p. 240) is a native of the East Indies, and has in a manner been extirpated in all the islands except Banda, which might easily supply every nation. The Dutch long appropriated to themselves the crop of nutmegs, as well as that of cloves and cinnamon, growing in the islands of Ternate, Ceylon, &c., either by right of conquest or by paying subsidies to the islanders.

The tree is distinguished into three sorts: the male or barren nutmeg; the royal nutmeg, or female producing the long nuts; and the queen-nutmeg, yielding the precious round nuts, intended to reproduce the females, but which gives separately, the one long nuts, intended to give males, the other round nuts, intended to produce the two sorts of females: namely, that producing the long, and that producing the round nut. The only difference between the royal and queen nutmeg is in the fruit: that of the royal is thicker, longer, and more pointed; the green shell is thicker, and it is longer in ripening; the green shell, after opening, preserves its freshness eight or nine days; the mace is more substantial, and three or four times as long, as that of the queen-nutmeg; and its stripes or thongs, of which there are from fifteen to seventeen principal ones, are of a livelier red; they are also broader, longer, and thicker, and not only embrace the nut throughout its whole length, but pass it and cross under it, as if to hinder it from falling. The royal nutmeg is generally from fifteen to sixteen lines long, thick in proportion, and has no longitudinal stripe. It remains on the tree a long time after the opening of the green shell, and gives birth to insects in the shell that feed upon it. The queen-nutmeg produces much smaller nuts, only nine or ten lines long, not so thick by a third, and well marked by a longitudinal groove on one side; they are round, and resemble a small peach: the green shell is not thick: the mace, which is composed of nine or ten principal stripes, grows only half down the nut, leaving it at liberty to escape and plant itself. By thus detaching itself, the nut prevents the insects from destroying it: the green shell also, changing at the end of two or three days, soon falls, and separates from the nut. This green shell, when preserved, has the fine taste of the nut itself.

The nutmeg-tree, with a smooth brown bark, rises perfectly straight. Its strong and numerous branches proceed regularly in an oblique direction upward. They bear large oval leaves, pendulous from them, some a foot in length; the upper surface smooth, and of a deep agreeable green; the under surface marked with a strong nerve along the middle, from which others proceed obliquely; it is of a uniform bright brown color, as if strewed all over with a fine brown powder; and the whole leaf is very fragrant.

When the fruit is ripe, the natives ascend the trees and gather it, by pulling the branches to them with long hooks. Some are employed in opening them immediately, and in taking of the green shell or first rind, which is laid together in a heap in the woods, where in time it putrefies. As soon as the putrefaction has taken place, there springs up a kind of mushrooms, called

boleti moschatyni, of a blackish color, and much valued by the natives, who consider them as delicate eating. When the nuts are stripped of their first rind, they are carried home, and the mace is carefully taken off with a small knife. The mace, which is of a beautiful red, but afterward assumes a darkish or reddish color, is laid to dry in the sun for the space of a day, and then removed to a place less exposed to his rays, where it remains for eight days, that it may soften a little. They afterward moisten it with sea-water, to prevent it from drying too much, or losing its oil. They are careful, however, not to employ too much water, lest it should become putrid, and be devoured by worms. It is last of all put into small bags, and squeezed very close.

The nuts, which are still covered with their ligneous shell, are for three days exposed to the sun, and afterward dried before a fire till they emit a a sound when they are shaken; they then beat them with small sticks, in order to remove their shell, which flies off in pieces. These nuts are distributed into three parcels: tho first of which contains the largest and most beautiful, which are destined for exportation; the second contains such as are reserved for the use of the inhabitants; and the third contains the smallest, which are damaged or unripe. These are burnt, and part of the rest are employed for procuring oil by pressure. A pound of them commonly gives three ounces of oil, which has the consistence of tallow, and preserves entirely the taste of nutmeg. Both the nut and mace, when distilled, afford an essential, transparent, and volatile oil, of an excellent flavor. The nutmegs which have been thus selected would soon corrupt if they were not watered, or, rather, pickled with lime-water, made from calcined shell-fish, which they dilute with salt-water till it attains the consistence of fluid pap. Into this mixture they plunge the nutmegs, contained in small baskets, two or three times, till they are completely covered over with the liquor; they are afterward laid in a heap, where they heat, and lose their superfluous moisture by evaporation. When they have sweated sufficiently, they are then properly prepared, and fit for a sea-voyage.

In the island of Banda the fruit of the nutmeg-tree is preserved entire in the following manner: When it is almost ripe, but previous to its opening, it is boiled in water and pierced with a needle. It is next laid in water to soak for ten days, till it has lost its sour and sharp taste. They then boil it gently in a sirup of sugar, to which, if they wish it to be hard, a little lime is added. This operation is repeated for eight days, and each time the syrup is renewed. The fruit, when thus preserved, is put for the last time into a thick syrup, and is kept in earthern pots closely shut. These nuts are likewise pickled with brine or with vinegar; and, when they intend to eat them, they first steep them in fresh water, and afterward boil them in syrup of sugar, &c. Nutmegs preserved entire are presented, in the east, as desserts, and the inhabitants of India sometimes eat them when they drink tea. Some of them use nothing but the pulp; others likewise chew the mace; but they generally throw away the kernel, which is really the nutmeg.

The Clove-Tree.—The *caryophyllus aromaticus*, or clove-tree, rises to the height of a common apple-tree, but the trunk generally divides, at about four or five feet from the ground, into three or four large limbs, which grow erect, and are covered with a thin smooth bark, which adheres closely to the wood. These limbs divide into many small branches, which form a sort of conical figure; the leaves are like those of the bay-tree, and are placed opposite on the branches. The flowers are produced in loose bunches at the end of the branches; are small, white, and have a great number of stamens, which are much longer than the petals. The flowers are succeeded by oval berries, which are crowned with the calyx, divided into four parts, and

spreading flat on the top of the fruit: the young fruit beaten from the trees before they are half grown, are the cloves used all over Europe and America. (See engraving, page 219.)

The clove-shrub is of a pyramidal form; leaves opposite, pointed at each end, and waving on the edge, on a petiole an inch in length, and red; this petiole is the most aromatic part of the whole shrub, not excepting even the clove. The flowers grow in a *bouquet*, at the ends of the branches; the petals are bluish, veined with white, rounded at the end, and concave; the fruit is reddish, and commonly encloses two seeds. The whole shrub is aromatic, and flourishes in moist situations. It is not confined to Banda and Amboyna, but is found at Ternate, and in all the Moluccas, in many of the South-sea islands, and New Guinea.

The Ebony-Tree.—The only species the *Cretica*, is a native of Crete. It rises three or four feet high, with a shrubby stalk, which sends forth several side-branches, garnished at each joint with hoary leaves, composed of five narrow spear-shaped lobes, which join at their tails to the footstalk, and spread out like the fingers of a hand. The branches are terminated by thick spikes of large purple flowers, of the butterfly or pea-bloom kind. The plants may be propagated from seeds sown in autumn. In this country the plants must be protected during winter, as they are unable to bear the cold.

Branches of the Ebony.

Travellers differ in accounts of the tree that yields the black ebony. Some make it a sort of palm-tree; others, a cytisus, &c. The most authentic is that of M. Flacourt, many years governor of Madagascar. He asserts that it grows very high and large, its bark being black, and its leaves resembling those of the myrtle, of a deep dusky green. Tavernier says the islanders always take care to bury their trees when cut down, to make them blacker, and prevent their splitting when wrought.

The Cipo.—This curious plant grows abundantly between Monte Santo and the river Bendegó, in Brazil. It is a climbing plant, destitute of leaves, and contains a milky juice, like an *euphorbium;* it bears no thorns, but often grows so as to form an impenetrable *plica*, which the cattle will seldom approach, much less attempt to break through, because, when the juice of this plant sticks to their hair, it occasions blisters and great irritation. Mornay made a cut at the bush with his hanger, in the dusk of the evening, when the wounds inflicted presented a beautiful luminous line, which was not transient, but lasted for several seconds, or a quarter of a minute. Having taken

a piece of the plant and bent it in the dark until the skin cracked, every crack showed the same light, which is of a phosphorescent appearance; continuing to bend the twig until the milky juice dropped out, each drop was a drop of fire, very much like that seen on dropping inflamed tallow; but without any particular smell. The milky juice is very poisonous and caustic, and occasions much itching and irritation, when applied to the skin. It becomes viscous in the air, and soon dries, of a yellowish color, slightly tinged with green, when it has the appearance of a gum-resin.

The Mangrove-Tree.—This singular tree is a native of the East Indies and Africa, where it grows to the height of ten or twelve feet, and is always found in moist and marshy places, generally within the influence of the sea, and where the tide can readily wash its stem. The mangrove is divided into a vast number of branches, which extend on all sides, and are thickly covered with oval shining leaves, about five or six inches long. The trunk and the lower branches send out several round, flexible shoots, which descend to the ground, and there take root. These shoots, in time, become so interlaced, as to produce an almost impenetrable grove, somewhat resembling the banyan-tree, but much thicker. In consequence of the mangrove-trees growing, as it were, in the water, they become the retreat of fishes, and especially of oysters. These last deposite their spat upon the stems and branches, which in time become loaded with them; and the oysters gathered from such situations may be readily known by pieces of the wood which are generally attached to the shell.

The Mangrove-Tree.

The Polypodium, or Tartarian Lamb, is a native of China, with a recumbent root, thick, and everywhere covered with the most soft and dense wool intensely yellow. This curious stem is sometimes pushed out of the ground in its horizontal situation by some of the inferior branches of the root, so as to give it some resemblance to a lamb standing on four legs, and has been said to destroy all other plants in its vicinity. Sir Hans Sloane describes it under the name of Tartarian Lamb, and Dr. Hunter, in his edition of the Terra of Evelyn, has given a more curious print of it, much resembling a sheep. The down is used in India externally, for stopping hemorrhages, and is called golden moss.

SUBJECT VIII.

HIGH LANDS OF THE EARTH.

IN taking a rapid survey of the extraordinary lineaments that characterize the external appearance of the globe, and constitute its superficies, it is natural to commence with the surface diversities of the land regions, and with those that immediately arrest the eye, and powerfully interest the mind. These are the elevations. They appear under the various forms of gentle slopes, bold hills, and majestic eminences which tower above the clouds, and seem to claim a sovereign authority over the territory in which they are situate. The term mountain is used with a very equivocal meaning, being applied alike to single eminences and to an entire group. It denominates, also, in one country, elevations which in another district, abounding with those of a superior class, would be regarded as mere hillocks. It has been proposed to confine the term to eminences ranging a thousand feet and upward above the general surface land, and to regard those which are below that standard as simple hills or slopes. The slighter acclivities, whether crowned with grove and forest—whether planted with vegetable productions by the cultivating hand of man, or left to the natural grasses—form the most pleasing features of the soil; while the loftier projections of the superficies, stamped with an air of dignity, and indicating an upheaving power of irresistible might in their construction, present to the eye a thousand imposing combinations. Fringed with the dark green pine, and spotted with the lighter mosses—with naked heads, as if in reverence of an invisible Superior—the mountains captivate while impressing the imagination. They are specimens of the fine arts of Nature, the gems of continents, wonderful examples of the diverse forms by which the ideas of beauty, majesty, and power, may be expressed.

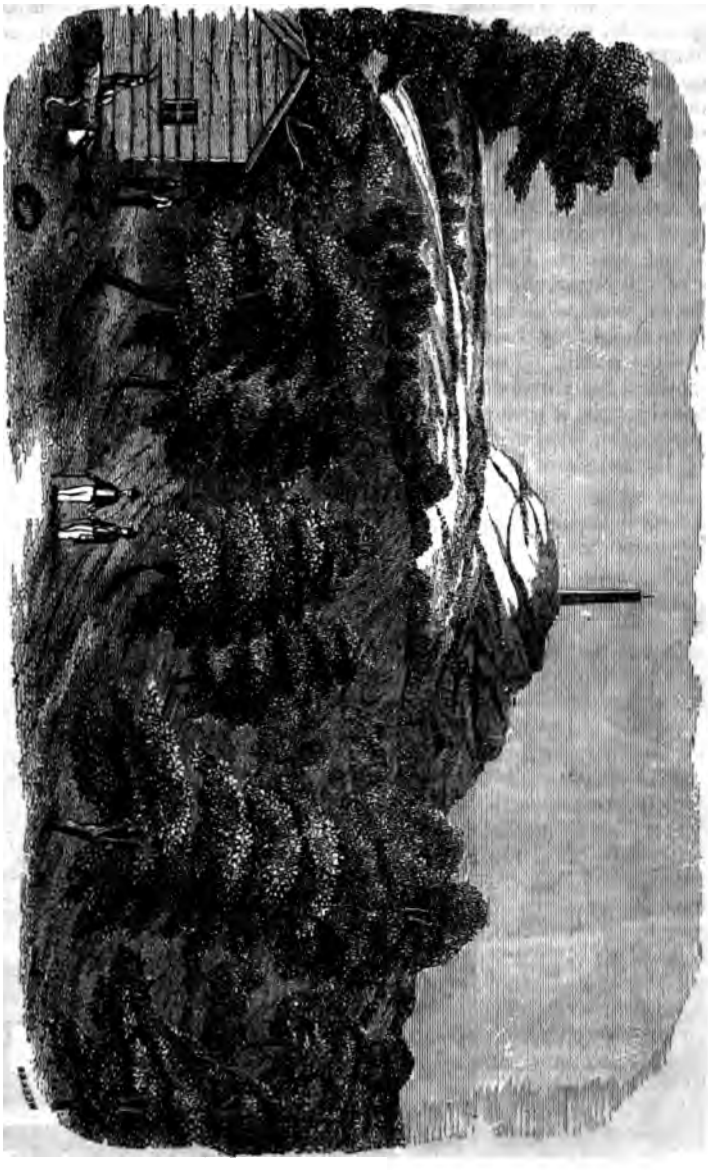
The high lands occur in isolation, or in groups, ridges, and chains. Groups of mountains have sometimes the appearance of elevations radiating from a central point where the height is the greatest, forming a kind of circular cluster; but clusters of very irregular form occur without any principal eminence. The most general arrangement of mountains is in chains and ridges—a ridge being simply an inferior chain. To this class those elevations belong which are so distributed as to form a kind of zone or band, the breadth bearing little proportion to the length; and whatever direction the zone may take, and whatever shape it may assume—that of a straight line, an angle, or a curve—it is said to constitute a chain. The term is not meant to signify an unbroken series of projections, answering to the appearance of a street in

Titan's Piazza.

ally conical; but others are circular, elliptical, or saddle-backed. The Table mountain at the cape of Good Hope has the shape of a gigantic altar. In the case of a number of contiguous mountains, their summits are often needle-shaped, or like the domes of Roman architecture. In many instances the entire mass resembles a vast wall, with battlements and towers, after the manner of an ancient fortress, and sometimes mountains appear piled upon each other, forming a succession of gigantic terraces, as seen in that portion of Mt. Holyoke, Mass., entitled Titan's Piazza. The form too of the Rock Mountain in Georgia is seen in the engraving.

The internal structure of elevations, as well as their external shape, displays great diversities. In fact, their outward character has been determined in a great degree by the substances of which they are composed. The granite mountains are the loftiest upon the surface of the globe, and present the most rugged and broken aspect, with very precipitous sides. Those of gneiss and mica slate are not so wild and irregular, nor are their declivities so steep; and those composed of secondary formations—sandstone, limestone, and greywacke—are of inferior elevation compared with the former, and the declivities are more gentle. Humboldt has pointed out a striking difference between the great mountains of the eastern and western continents. Mont Blanc, and others of the higher Alps, lift their granite heads far above the clouds, and, with the Himalaya, form the loftiest points of the old world; but in America the newest flœtztrap or whinstone, which in Europe appears only in low mountains, or at the foot of those of great magnitude, covers the mightiest heights of the Andes. Chimborazo and Antisana are crowned by vast walls of porphyry, rising to the height of six or seven thousand feet; while basalt, which in Europe has never been observed higher than four thousand feet, is, on the pinnacle of Pichinchae, seen rearing aloft its crested steeps, like towers amid the sky. Other secondary formations, as limestone, with its accompaniment of petrified shells and coal, are also found at greater heights in the new than in the old world, though the disproportion is not so remarkable.

The most elevated European sites are found in the Alps, many of which have been reached by the foot of man, but not without great difficulty and peril, and in the attempt fatal accidents have repeatedly occurred. Mont Blanc, the centre and highest summit of the great Alpine range, an enormous mass of primitive rock, rises to the height of 15,732 feet above the sea level, and is visible at Dijon, a distance of one hundred and forty miles. The form of the mountain is pyramidal as seen from the north and south, but from the valley of Chamouni it resembles the back of a dromedary, on account of which *Bosse de Dromedaire* is one of its local titles. The extreme summit, a ridge nearly two hundred feet in length, was reached for the first time in August, 1785, by Dr. Paccard and James Balma; and the year following, Sussure succeeded in the same enterprise, remaining five hours upon the top making scientific experiments. In the autumn of 1834, Dr. Barry ascended, passing by "chasms of unfathomable depth, towers of ice, caverns of almost



crystal walls, splendid stalactites guarding the entrance." His principal guide had been up eight times before, the survivor of four swept away by an avalanche in Dr. Hamel's attempt in 1820. In the year 1804, the Archduke John offered a reward to whosoever reached the summit of the Ortler Spitz, the highest of the Thætian Alps. A native of the Passayer, accompanied by two peasants, accomplished the enterprise, before considered impracticable, starting with the full moon at midnight. Travellers, naturalists, and the daring peasants of the country, have scaled many of the other lofty Alpine peaks, and now the Jangfrau or Virgin mountain, so called from its supposed inaccessibility, has had the foot of the Swiss hunter upon her brow. The highest parts of Africa, as at present known, are in Abyssinia, but fall below those of Europe, though very nearly equal to them. Some of the summits of the Atlas range, are supposed to reach 12,000 feet, and the high lands of Ethiopia approximate to the loftiest of the Alps. Asia possesses in the Caucasus and eastern Taurus some very elevated positions. The culminating point of the latter, the peak of Demawund, about forty miles from Teheran, in Persia, was ascended by Mr. Taylor Thompson, in the year 1837, who found its height, by barometric measurement, to be 14,300 feet above the level of the ocean. The snow-crowned head of the towering Kasibeck, situated toward the European extremity of the pass of the Caucasus from Russia into Georgia, is estimated by Professor Parrot at 2,400 fathoms, or 14,000 feet, above the level of the Black sea; but this is exceeded by Elbûrz, which attains the height of 16,700 feet, and the two peaks of the celebrated Ararat

Mount Ararat.

are still loftier. "These inaccessible summits," says Sir Robert Ker Porter, "have never been trodden by the foot of man since the days of Noah."

Tournefort was obliged to abandon the enterprise in the year 1700, after having endured great fatigue. At a more recent period, the pacha of Bayazeed fitted out an expedition, and built huts, supplied with provisions, at different stations; but his people suffered severely amid the snows and masses of ice, and returned without accomplishing their purpose. The statement of Porter, true in 1820, ceased to be so nine years afterward. Professor Parrot, in 1829, effected the ascent of Ararat, and in 1834 the mountain was again scaled by M. Autonomoff, in order to vindicate the reputation of the Prussian traveller, whose veracity had been called in question by the Armenian ecclesiastics, and the American missionaries Smith and Dwight. Its height is given at 17,260 feet, which exceeds by 1,528 feet the highest elevation of Europe; but the table land of Armenia, from which it rises, is stated by Ritter to be 7,000 feet above the level of the sea. There is a far greater elevation attained by some of the Himalaya mountains, which separate the valleys of Cashmere from Thibet, and present the loftiest projections to be found upon the terrestrial surface. On the west, Javaher rises to the height of 25,746 feet, and on the east Dhwalagiri, to 27,737 feet above the sea. The highest summit on this continent was once supposed to be Chimborazo, in the Andean chain, and likewise the greatest altitude on the surface of the globe, but it is now deprived of the distinction. Though 21,440 feet above the level of the ocean, and one of the grandest objects in the great American range, it is lower by nearly the whole height of Vesuvius, than the Nevada do Sorata, in the eastern cordillera of Peru. Ben Nevis has recently been shorn of a similar honor. Long regarded as the monarch of the British mountains, it is now known to be surpassed in height by Ben-Mac-Dui, in the group of Cairngorm, on the borders of Inverness-shire. The mean height of the Andes, apart from projecting cones, is estimated at 6,000 feet in Patagonia, 8,000 in Chili, and 15,000 in Peru.

The estimated heights of the principal mountains are given in the table below, but a few of these have not been determined with accuracy. A remarkable instance of close approximation in calculating the height of Etna, occurred between independent observers, pursuing different methods, at distinct times, unknown to each other. The Sicilians, vain of their mountain, attributed to it an elevation of 13,000 feet, which Captain Smyth, when surveying in the Mediterranean, reduced by more than 2,000, an abridgment which raised no little anger and contention. The result was subsequently verified by Sir John Herschel: "The height," he observes, "of the higher of the two summits of Etna, which I measured barometrically in 1824, came out to be 10,872½ English feet above the level of the sea of Catania. Captain Smyth's result, with which I was not acquainted till long after the calculation of my own, gave 10,874." It has been imagined that most of these chains are mutually connected, and form one grand consecutive scheme of high lands stretching through the extent of both continents, in the form of a vast irregular arch. Could a spectator command a view of the globe, supposing him to stand in New Holland facing the north, he would see on his right hand a continuous system of high mountains extending along the entire coast of America, linked with Asia by the Aleutian Isles. He would see also a chain on his left hand running along the coast of Africa, passing through Arabia into Persia, mingling there with the range that traverses Europe from the Atlantic, and merging in the mountains of central Asia, which are continued northeasterly to Behring's straits, and form the spine of the Old World. Thus, while these chains of mountains, when viewed in detail, appear isolated and utterly unsystematic, yet when the globe is contemplated upon a grand scale, they seem to constitute one immense range in the form

of an irregular curve, with outshoots from it, bounding the bed of the Pacific on the north east and west.

AMERICA.

	Feet.		Feet.
Nevada di Sorata, Andes	25,400	Mount St. Elias, California	17,863
Nevada d'Illimani, "	24,450	Silla de Caraccas, Venezuela	8,633
Chimborazo, "	21,425	Blue mountains, Jamaica	7,278
Antisana, "	19,136	Mount Washington, Appalachians	6,650
Cotopaxi, "	18,867	Itacolumi, Brazil	5,756
Popocacepetl, Mexico	17,720	Saddle mountain, Massachusetts	4,000

EUROPE.

Mont Blanc, Alps	15,732	Sneehaetha, Dofradeld, Norway	8,122
Mont Rosa, "	15,150	Lomnitz, Carpathian	7,900
Finster-Char-Horn, Alps	14,109	Punda, Ural, Russia	6,780
Jungfrau, Alps	13,716	Mont Mezin, Cevennes	6,367
Ortler Spitz, "	12,852	Puy de Sancy, Auvergne	6,215
Mulhacen, Granada, Spain	11,678	Ben-Mac-Dui, Scotland	4,300
Nethon, Pyrenees	11,427	Vesuvius, Italy	3,978
Perdu, "	11,275	Hecla, Iceland	3,890
Etna, Sicily	10,873	Snowdon, Wales	3,890
Monte Corno, Apennines	9,523	Stromboli, Lipari Isles	3,650

ASIA.

Dhwalagiri, Himalaya	27,737	Ophir, Sumatra	13,840
Javaher, "	25,746	Egmont, New Zealand	11,430
Ararat, Armenia	17,260	Italitzkoi, Altain chain, Tartary	10,735
Elbûrz, Georgia	16,700	Lebanon, Palestine	9,690
Mowna Roa, Sandwich isles	15,988	Awatsha, Kamschatka	9,600
Peak of Demawund, Persia	14,300	Bithynian Olympus, Anatolia	6,500
Kasibeck, Georgia	14,400	Sea-View Hill, New South Wales	6,500

AFRICA.

Geesh, Abyssinia	15,000	Clarence peak, Fernando Po	10,655
Peak of Teneriffe, Canary isles	12,180	Table mountain, Cape of Good Hope	3,582
Miltoin, Barbary	11,400	Diana's peak, St. Helena	2,692

ANTARCTIC CONTINENT.

Mount Erebus and Mount Terror	10,000	Mountains in Adelie Land	1,500

In the following list, the elevation of several remarkable localities are stated, with some of the highest altitudes occupied by man, and reached by him :—

	Feet.
Ascent of Gay Lussac, at Paris, in 1804, being the greatest height ever attained by a balloon	22,900
Greatest altitude attained by MM. Humboldt and Bonpland, on Chimborazo, in 1820	19,400
Highest flight of the condor on the Andes	21,000
Manerring pass, in the Himalaya, crossed by Captain A. Gerard	18,612
Absolute height of a village in the Himalaya, visited by Captain Gerard, perhaps the highest inhabited spot on the globe	13,500
Farm of Antisana, the highest inhabited spot on the Andes	13,435
Manasarooa lake, in Thibet	14,500
Milum temple, near the source of the Ganges	13,000
Greatest altitude of the peach, apricot, and walnut growing luxuriantly in the Himalaya	9,000
Thick woods of pine and birch trees in the Himalaya, the latter attaining a large size	14,000
Bushes seen in the Himalaya	17,000
Absolute elevation of poplars found by Gerard in the Himalaya, twelve feet in girth	12,000
Highest point of road across the Andes	11,499
Elevation of Quito, the highest city of the globe	9,542
Elevation of Santa Fe de Boacta	8,727
Elevation of the city of Mexico	7,520
Highest pass in Europe, that of the Cervin, over the Pennine Alps	11,096
Highest constructed road in Europe, the pass of the Ortler Spitz	9,100
Pass of the Col de Tende over the Marentine Alps	5,887
Pass of Mount Cenis over the Graian Alps	6,773
Pass of the Simplon over the Pennine Alps	6,578
Highest inhabited spot in Europe, the convent of St. Bernard	8,606
Convent of St. Gothard	6,900
Mine of Real del Monte, in Mexico	9,120
Highest growth of Peruvian bark	9,500
Lake Lucon, in Switzerland	6,220
Residence of Bonaparte in St. Helena, Longwood house	2,000
Lake of Geneva, in Switzerland	1,207

Contemplating the projections of the surface with reference to their absolute elevation above the level of the sea, some of them appear protuberances of enormous bulk, and we are apt to imagine that they must detract largely from the regularity of the earth's spherical form. But they become insignificant when compared with the volume of the globe itself, the highest eminence, that of between five and six miles, being only about $\frac{1}{800}$ of the semi-diameter of the sphere. They bear, therefore, much the same proportion to the terrestrial spheroid as the little risings on the coat of the orange to the fruit. Books of travels abound with conflicting statements respecting the distance from which particular mountains may be seen. The length of the line of visibility is not only influenced by conditions of the atmosphere, but by the character of projections, apart from their height. The peak of Teneriffe is not so frequently visible at the same distance as those tops of the Andes which are of corresponding elevation, not being, like them, invested with perpetual snow. Humboldt remarks, that the cone of the former no doubt reflects a great degree of light on account of the white color of the pumice with which it is covered; but its height does not form a twenty-second part of the total elevation, and the sides of the mountain are coated with blocks of dark-colored lava, or with luxuriant vegetation, the masses of which reflect little light, the leaves of the trees being separated by shadows of greater extent than the illuminated parts. He refers the peak, therefore, to that class of mountains which are seen at a great distance only in a negative manner, or because they intercept the light transmitted from the extreme limits of the atmosphere. Still, it has been observed at the distance of 124, 131, and even 138 miles; and the summit of Mowna-Roa, in the Sandwich islands, has been seen, at a period when it was destitute of snow, skirting the horizon from the distance of 183 miles. This is the most remarkable example yet known of the visibility of high land, and as Mowna-Roa was negatively seen, both cases refute the theory of Bouguer, that mountains seen negatively can not be perceived at distances exceeding one hundred and twenty-one miles.

The summits of the superior elevations are regions of perpetual snow and ice, and below the limits of constant congelation there is a zone in which snow lies upon the surface through the greater part of the year. The accumulations above and near the line where perpetual frost commences, constitute some of the most dangerous and terrible phemomena of high mountain districts. When the mass becomes so great that the inclined plane on which it rests can no longer support it, or when the pile which has been heaped together by the winter snow-storms becomes loosened by the action of the sun in spring and summer, it descends with immense violence from its site into subjacent valleys, sometimes filling them up with its volume, and burying man, beast, and village, beneath its load. The avalanches composed chiefly of drifts are not so dangerous and destructive as those of snow rendered clammy by a thaw. The former may frequently be removed without much danger being sustained, but the latter are precipitated in compact masses, and carry away or crush the objects that lie in their path. In the canton of the Grisons, an avalanche descended in the year 1749, upon the valley of Tawich, and entirely covered the whole village of Rueras. The snow torrent fell in the night without disturbing some of the inhabitants, who, on awaking in the morning, were surprised that the day did not break. Sixty out of a hundred persons were rescued from their perilous situation alive, a sufficient quantity of air to support life being obtained through interstices in their snowy canopy. In the same canton, an avalanche descended upon Val Calanca, in 1806, which removed a forest from its site to an oppo-

side of the valley, and fixed a fir-tree upon the roof of the parsonage house. lanches occur in the Pyrenees and in Norway, but are most frequent in high Alps, owing to their abrupt and precipitous declivities. They are n set in motion by vibrations of the air, such as the discharge of a musket, ı peal of thunder, or the mere passage of a traveller, will produce; and ıce in districts subject to them a cautious silence and wary footsteps are oined upon the inexperienced visiter. Professor Forbes gives a striking tance of encountering a highly electrical condition of the atmosphere, when a considerable elevation in the Alps: "We were still above nine thousand t above the sea, when I noticed a curious sound which seemed to proceed m the Alpine pole with which I was walking. I asked the guide next whether he heard it, and what he thought it was. The members of that ternity are very hard pushed indeed when they have not an answer ready any emergency. He therefore replied with great coolness, that the rust- g of the stick proceeded from a worm eating the wood in the interior. ıis answer did not appear to me satisfactory, and I therefore applied the *perimentum crucis* of reversing the stick, so that the point was now upper- ɔst. The worm was already at the upper end. I next held my hand ove my head, and my fingers yielded a fizzing sound. There could be but e explanation—we were so near a thunder-cloud as to be highly electrified induction. I soon perceived that all the angular stones were hissing und us like points near a powerful electrical machine. I told my compan- ns of our situation, and begged Damatter to lower his umbrella, which he d hoisted against a hail shower, and whose gay brass point was likely to ɔcome the *paratonnerre* of the party. The words were scarcely out of my outh when a clap of thunder, unaccompanied by lightning, justified my ecaution." The thunder-clap, the hunter's horn, or even the human voice, ıs frequently shook the nicely-poised avalanche from its site, and hurled it to lower regions, crushing trees, sweeping away rocks, and damming up e streams that have lain in its course.

Besides accumulations of snow, we meet with glaciers in high regions, or ctensive fields of ice. These are formed of avalanches partially thawed ıring the heat of summer. The water yielded by the melting of the sur- ce, in connexion with rain, percolates through the mass, which acquires ɔnsistency, and is converted into eternal ice by the frost of a following win r. Iceland is appropriately named from the number and extent of its gla ers, which are there known by the name of yokuls, signifying large masses f ice. The most extensive, the Klofa yokul, in the eastern quarter of the land, is a vast chain of ice and snow mountains, supposed to fill a space of ıree thousand square miles. Some of the yokuls are remarkable for their ıcillation, not remaining in a settled position, a peculiarity common to the lpine glaciers. These ice formations are found among the Norwegian ighlands, in the chain of the Pyrenees, upon the Sierra Nevada of Spain; ut their grand European site is the Alps. "If," says Saussure, "a specta- ɔr could be placed at sufficient height above the Alps, to embrace at one iew those of Switzerland, Savoy, and Dauphiné, he would see a mass of ıountains intersected by numerous valleys, and composed of several parallel hains, the highest in the middle, and the others decreasing gradually as they ecede. The central and highest chain would appear to him bristled with raggy rocks, covered, even in summer, with snow and ice in all those places hat are not absolutely vertical; but on both sides of the chain, he would ee deep and verdant valleys, well watered and covered with villages. Ex- mining still more in detail, he would remark that the central range is com- ɔsed of lofty peaks and smaller chains, covered with snow on their tops,

but having all their slopes that are not very much inclined, covered with ice, while the intervals between them form elevated valleys filled with immense masses of ice, extending down into the deep and inhabited valleys which border on the great chain. The chain nearest to the centre would present to the observer the same phenomenon, but on a smaller scale, beyond which he would see no more ice, nor even snow, save here and there on some of the more elevated summits." Saussure therefore recognised two kinds of glaciers; the first contained in the valleys, more or less deep, and which, though at great elevations, are still commanded on all sides by mountains higher still; the second not contained in valleys, but spread out on the slopes of the higher peaks.

The glacier system of the Alps embraces an extensive area. M. Ebul estimates, that there may be at least four hundred of the larger sized glaciers, varying from three to thirty miles in length. The aggregate superficial extent of all those of the Tyrol, Switzerland, Piedmont, and Savoy, is calculated by some authorities to amount to not less than fourteen hundred

Glacier of the Rhone

square miles. The greatest breadth of an individual specimen is seldom more than two miles. The thickness varies from a hundred to six hundred feet. The glaciers are moving masses, slipping down the inclined planes upon which they are situate by the impulse of their own gravity, when their adhesion to the surface of the earth has been weakened by the heat of summer. This motion gives rise to the extraordinary spectacle of summer productions and winter formations being sometimes in immediate contact with each other, the ice-fields obtruding into flowery meadows, and gradually forcing their way into the regions of cultivation. According to Professor Forbes, the very huts of the peasantry are sometimes invaded by this moving ice, and many persons now living have seen the full ears of corn touching the glacier, or gathered ripe cherries from the trees with one foot standing on the ice! The rate of advance of different glaciers, varies considerably. M. Ebul states, that in the valley of Chamouni, they travel at about fourteen feet a year, while in that of Grindelwald, the glaciers move rather faster, at the rate of twenty-five feet in a year, a difference probably attributable to the ground being variously inclined. The same glacier will also make more progress in one year than in another, according as a summer of lesser or greater warmth renders its liberation more or less complete. Captain Hall remarks upon the ploughing up of the ground lying before a glacier by its

t, as an obvious proof of its progression, and instances the remarkable of the glacier of Brenva falling into the lower part of the Allée Blanche, y crossing from one side of the valley to the other, and being so irresis- r pressed forward by the weight of snow on its shoulders, high up the s of Mont Blanc, that on reaching the opposite side of the valley, it ac- ly travels for a considerable distance up the bank. "The guides," he arks, "pointed out the corners of green fields, peeping out from the sides the glacier in the middle of the valley, and showed us traces of walls and ces which had belonged to large villages, now entirely obliterated by the ving mass. I took notice of one circumstance, which told the fatal story y well. We had walked along a well-worn footpath till our course was uptly stopped by the edge of the glacier; but on crossing over it, we re- covered our footpath, which had been quite hidden by the intervening ss." There is a limit, however, put to the encroachment of the glaciers. e lower extremities are gradually thawed away in the warm atmosphere the valleys, so that though pushed forward by the weight of ice and snow umulated at the upper extremities during the winter, there is a "bound ed by a perpetual decree," beyond which they can not pass. The glaciers ibit a singularly diversified aspect, hues varying from the purest white to lue and green tinge, surfaces resembling in some parts a smooth and pol- ed mirror, and in others, a sea frozen when angry and tempest-tost.

The sudden descent of ice in the form of an avalanche, sometimes occa- ns disastrous results, blocking up to a certain height a contracted valley, l arresting the progress of its streams; a lake forms which becomes per- nent, if the barrier be composed of solid materials, in a quantity sufficient resist the pressure of the accumulated waters. In that case, the lake will on increasing, till, rising to the level of some crevice, or of the summit of mound, its waters are discharged, and thus a beautiful expanse with a cade is added to the scenery of the valley. It generally happens, how- r, that such lakes are only temporary, owing to the looseness of the ram- rt being unable to withstand the enormous and increasing pressure of the ested waters, or owing to its materials consisting of snow and ice, which gradually wasted. The consequence is, that the barrier is forced, and valley below is subject to the action of a mighty deluge, largely altering features by its rapid and resistless rush, destroying the dwellings of its in- bitants with the monuments of their industry, and sometimes involving a rful sacrifice of life, the flood at last subsiding into a peaceful stream, but nding its way in a different channel to that pursued before the waters were mmed up, a bed constructed by the powerful sweep of the newly-emanci- ted torrent. One of the most memorable instances of this kind occurred 1818, in the Val de Bagnes, one of the transverse branches of the great gitudinal valley of the Rhone, above the lake of Geneva. The valley, or ky glen, extends from thirty to forty miles, and presents steep and rugged untain walls, the summits ascending above the limit of perpetual snow, d exhibiting glaciers on their slopes. At the top of the valley, the river anse has its origin in the two glaciers of Chermontane and Mont Durand, d flows along its course to its termination at Martigny, where it joins the one, of which it is one of the chief affluents. Not far from the upper end the Val de Bagnes, it is formed into a narrow gorge by the approxima- g flanks of Mont Pleureur on one side, and Mont Mauvoisin on the other, tween which is the glacier of Getroz. From this glacier large masses of are continually detached, which, falling into the ravine, tend to fill up contracted channel, and arrest the progress of the Dranse. For several rs previous to the time referred to, the river had been much obstructed

by blocks of ice and snow, which at length accumulated so as to resist the heats of summer, and ultimately form a conical projection of the glacier itself completely across its bed to the height of about a hundred feet. In April, 1818, the Dranse was dammed up, and a lake began to form, which soon attained a considerable magnitude. It was obviously in the highest degree probable that the icy barrier would not be able to hold out long against the increasing pressure of the waters, and the sudden efflux of such a mighty volume as was collected, would as certainly desolate the Val de Bagnes. To avoid this calamity, which every day became more impending, an engineer started the bold scheme of tunnelling the rampart of ice, and was employed by the government of the canton for that purpose. This scheme, says the memoir of M. Escher upon it, "was begun on the tenth of May, and finished on the thirteenth of June, under the direction of M. Venetz. The gallery was sixty-eight feet long, and during its formation the workmen were exposed to the constant risk of being crushed to pieces by the falling blocks of ice, or buried under the glacier itself." The lake at this time contained at least eight hundred millions of cubic feet of water, which in three days was reduced to five hundred and thirty millions, by the discharge from the gallery. The sequel may be best related in the words of the memoir:—

"As soon as the water flowed from the lower end of the gallery, the velocity of the cascade melted the ice, and thus wore away the gallery at its mouth. The water which had penetrated the crevices of the glacier caused enormous fragments of ice to fall from the lower sides of it; so that owing to these causes the body of the glacier, which formed the retaining wall of the lake, was so much diminished in thickness that the floor of the gallery was reduced from its original length of six hundred to eight feet. As soon as the cascade had cut through the cone of ice, it attacked the debris of the base of Mauvoisin, upon which the cone rested; that is to say, the torrent undermined the glacier by washing away the loose materials forming the bed of the stream, on which the mass of ice had been piled up; and having carried it off by degrees, it became able to push the soft soil from the foot of Mont Mauvoisin, and excavate for itself a passage between the glacier and the rocky beds which compose the mountain. As soon as this happened, the water rushed out, the ice gave way with a tremendous crash, the lake was emptied in half an hour, and the sea of water which it contained precipitated itself into the valley, with a rapidity and violence which it is impossible to describe. The fury of this raging flood was first stayed by the narrow gorge below the glacier formed between Mont Pleureur and a projecting breast of Mont Mauvoisin: here it was engulfed with such force that it carried away the bridge of Mauvoisin, ninety feet above the Dranse, and even rose several fathoms above the advanced mass of the mountains. From this narrow gorge, the flood spread itself over a wider part of the valley, which again contracted into another gorge; and in this way, passing from one basin to another, it acquired new violence, and carried along with it forests, rocks, houses, barns, and cultivated land. When it reached Le Chable, one of the principal villages of the valley, the flood, which seemed to contain more debris than water, was pent up between the piers of a solid bridge, nearly fifty feet above the Dranse, and began to attack the inclined plane upon which the church and the chief part of the town are built. An additional rise of a few feet would have instantly undermined the village; but at this critical moment the bridge gave way, and carried off with it the houses at its two extremities. The flood now spread itself over the wide part of the valley between Le Chable and St. Branchier, undermining, destroying, and hurrying away the houses, the roads, the richest crops, and the finest trees, loaded with fruit. Instead of being encumbered with

heap spoils, the moving chaos received from them new force; and when it reached the narrow valley extending from St. Branchier to Martigny, it continued its work of destruction till its fury became weakened by expanding itself over the great plain formed by the valley of the Rhone. After ravaging Le Burg and the village of Martigny, it fell with comparative tranquillity into the Rhone, leaving behind it the wreck of houses and of furniture, thousands of trees torn up by the roots, and the bodies of men and of animals whom it had swept away."

It was calculated by the writer of the memoir, that the flood for the first four miles swept along at the rate of twenty miles an hour, nearly the speed of a locomotive, and furnished about three hundred thousand cubic feet of water every second—an efflux five times greater than that of the Rhine at Basle. In six hours and a half, it arrived at the lake of Geneva, having passed into the Rhone, a distance of forty-five miles. Among the physical alterations effected by this debacle, there was the deposition of a stratum of alluvial matter over the whole of the lower part of the Val de Bagnes. This was several feet in thickness, and was so distributed that roads were obliged to be cut through it in some places, as when the snows have blocked up our thoroughfares. There was the transportation of an immense number of isolated masses of rock to a considerable distance, some of which must have been many tons in weight. One of these, fairly projected out of the gorge of the valley into the plain, measured twenty-seven paces round, twelve feet in height, and twelve feet across in one direction, and even larger masses bore indubitable marks of having been in motion. For some time the course of the Dranse fluctuated, and when at last it settled down into a channel, it was one widely different from that which had before been followed. Captain Hall visited Martigny a few weeks after this visitation, and found every landmark obliterated under one uniform mass of detritus, which had levelled all distinctions in a "sweeping and democratic confusion."

But of all the phenomena exhibited by the high lands of the globe, those of the active volcanoes are the most peculiar and sublime. The term is derived from Vulcanus, the imaginary god of fire among the Romans, and is applied to those mountains which are the vents of igneous action, ejecting from their sides or summits flame, smoke, ashes, and lava streams. They are, in general, elevations of a conical form, terminating at the summit with a hollow, called a crater or cup from its shape. Smoke is constantly issuing from the tops of some of these mountains, but the violent paroxysms during which stones are discharged, and torrents of red-hot lava, occur only at distant and irregular intervals. The eruptions frequently issue from several openings, or smaller craters, within the superior one, the number and size of which are considerably varied by eras of disturbance. These eras are generally preceded, in some instances for several weeks, by the shocks of earthquakes, or by immense columns of smoke issuing from the volcano about to exhibit explosion, often involving the neighboring country in darkness. Sounds resembling the successive

Volcano of Orizaba.

discharge of a park of artillery are then heard, followed by sudden flashes of flame, and showers of stones. A stream of lava next bursts forth from the side of the mountain, or in a great eruption from the crater, flowing in a sluggish fiery current down the declivities. After the lava ceases to flow, the volcanic ashes, composed of various materials, are thrown out of the summit in immense quantities, sufficient to cover the vicinity for miles. The products of volcanoes differ to some extent, those of America throwing out water, and in some instances fish, besides the ordinary materials. It is singular, also, that in the New World, the active volcanic sites are chiefly continental, while in the Old World they are mostly found in the islands. In both regions, however, they are almost invariably situated near the sea, or some inland collection of water. Upward of two hundred are known to exist, distributed as follows, according to Professor Jameson's statement:—

Europe, on the continent, 1.	On islands, 12.	America, on the continent, 97.	On islands, 19.
Asia, " " 8.	" " 58.	Africa. " " unknown.	" " many.

In addition to the above, Mount Erebus, on the south polar continent, is an active volcano of immense size. The mass and elevation of volcanoes seem to regulate the occurrence of eruptions, the smallest being the most active. Thus Stromboli, an inferior elevation, is almost always flaring as the great lighthouse of nature in the Mediterranean. Vesuvius, far less than Etna, is the most active of the two, while Cotopaxi, a mountain of enormous volume, reposes for centuries.

Of existing volcanic action, the most sublime and imposing example perhaps to be found in the world, is in the island of Hawaii, formerly called Owhyhee. The whole island seems to be an immense hollow cone, having an area of 4,000 square miles, and attaining an elevation of 16,000 feet, the height of Mowna Roa. It forms a pyramidal chimney over a vast incandescent mass burning beneath it, and also under some part of the bed of the surrounding ocean, having numerous vents through which the furnace below communicates with the atmosphere above. Lord Byron and a party of officers from the Blonde frigate, with the Rev. Mr. Stewart, visited the crater of Kirauea, near the base of Mowna Roa, and witnessed a scene, says the describer, more horribly sublime than anything he had ever imagined to exist even in the idler visions of unearthly things. Arrived at the brink of the crater, they stood looking down into a fearful gulf, fifteen hundred feet in depth, and upward of two miles in circumference. The edge of the crater was so steep, that it seemed as if by a single leap they could plunge into the lowest abyss. Its surface had all the agitation of an ocean. Billow after billow tossed its monstrous bosom into the air, and occasionally the waves from opposite directions met with such violence as to dash the fiery spray in the concussion forty or fifty feet high. Such was the agonizing struggle of the action within—the appalling sounds of the conflicting elements, muttering and sighing, groaning and blowing, that one of the party shrunk back, exclaiming: "Call it weakness, or whatever you please, but I can not look again!" About fifty cones of various heights, active chimneys of volcanic fire, were counted in the abyss. Volumes of smoke and steam were ascending from these vents, but as the evening closed, fire after fire appeared glimmering through the vapor. Some of the cones were ejecting fragments of rock; others, ashes, lava, and boiling water; streams of fire seemed to be running among the laboring craters; forming a scene which, in connexion with the roar of the elements bursting from their prison, reminded the party, as one of them expressed it, of the lake that burneth with fire and brimstone. To the bottom of the abyss it is well known that a Christian con-

Mount Hecla.

vert descended, and plunged a stick into the fiery deluge! an act of female heroism to dispel the illusion of her countrymen, who were spectators at a distance, and who fancied that Peli, the god of the Kirauea fires, would punish with instant destruction any violation of his sanctuary.

One of the most tremendous volcanic eruptions ever recorded, was that which issued from the Tomboro mountain, in the island of Sumbawa, for an account of which we are indebted to Sir Stamford Raffles. It began on the 5th of April, 1815, and continued, with some intermissions, until the June following. The sound of the explosion was heard at Ternate, on the western coast of Gilolo, a distance of seven hundred and twenty geographical miles: and in Sumatra, which is nine hundred and seventy. In some parts of the island violent whirlwinds carried up men, horses, and cattle into the air; the sea was covered with the trunks of trees which had been torn up; and the ashes from the mountain, wafted to Tara and Celebes, a distance of three hundred miles, caused a darkness in the daytime more profound than had ever been known in the darkest night. To the west of Sumatra the sea was coated with a mass of cinders two feet thick, and many miles in extent, and ships with difficulty forced their way through it. "We grounded," says one of Sir Stamford's correspondents, "on the bank of Bima town. The anchorage of Bima must have been altered considerably, as, where we grounded, the Ternate cruiser lay at anchor in six fathoms a few months before." The area over which the effects of the eruption extended was upward of two thousand English miles in circumference: the surface of Sumbawa was considerably altered; acclivities were turned into valleys, and valleys into elevations; and of its unfortunate inhabitants, out of a population of twelve thousand, only twenty-six persons escaped.

The volcanic regions include those where there are active vents and extinct craters, with intervening districts often shaken by earthquakes and abounding with hot springs, the evidences of subterranean igneous action. There are three large continuous areas of this kind.

To the island at the southern extremity of America, Magalhaens gave the name of Terra del Fuego, or the land of fire, no doubt from the sensible display of igneous activity; for the assertion of Malte Brun is corroborated by the evidence of Captain Hall, with reference to the existence of an active volcano at the present time. Proceeding northward along the coast which fringes the Pacific ocean, there is scarcely one degree of latitude from the forty-sixth to the twenty-seventh, in which there is not an active vent. The Chilian volcanoes rise up through granitic mountains. Villarica, one of the principal, is always burning, and so lofty as to be distinguished at the distance of a hundred and fifty miles. A year never passes without some slight shocks of earthquakes in the province, and about once in a century, or oftener, tremendous convulsions shake the land from one end to the other. In Peru there is the same continual disturbance of the surface, more or less violent, though only one active volcano is at present known. Still further north, about the middle of Quito, where the Andes attain their loftiest altitude, the peaks of Tunguragua, Cotopaxi, and Antisana, are in frequent play. From the sides of the former a mass of mud was ejected in 1797, which dammed up rivers, occasioned new lakes, and filled up valleys a thousand feet wide to the depth of six hundred feet. In the province of Pasto, further north, there are three volcanoes; in Papayan, three others; in Gautemala and Nicaragua, no less than twenty are in an active state. Hitherto we have followed this great volcanic chain almost due north. In Mexico, however, it turns off in a side direction, extending on the west to the isles of Revilagido and the Californian peninsula, and embracing eastward the whole of

e West Indian isles. The length of this enormous chain, from Cape orn to Missouri, is greater than from the pole to the equator. Its west-

Jorullo, Mexico.

ard extent is hid from us by the waters of the Pacific; but probably it acnes across the whole of its immense bed. Cotopaxi is described by umboldt as the most beautiful and regular of all the colossal summits of the nnes, being a perfect cone, which is covered with snow, and shines with azzling splendor at sunset. There are no rocks projecting through its icy andle, except near the edge of the crater, which is surrounded by a small rcular wall. The traveller tried to reach the summit, but failed, owing to e cone being surrounded by deep ravines, and pronounces the ascent to e crater impossible. This is the highest of the Andean volcanoes which ave recently been in an active state. If the 3,932 feet of Vesuvius were lanted upon the top of Etna, which has an elevation of 10,873, Cotopaxi ould not be equalled in altitude by 4,073 feet. Its eruptions have been pon a scale corresponding with its magnitude. In 1738 its fires ascended ,953 feet above the crater, and in 1744 its voice was heard at Honda, on e river Magdalena, a distance of nearly seven hundred miles. In 1768, e inhabitants of two neighboring towns were obliged to use lanterns by ay in the streets, owing to the quantity of ashes ejected, and at two hundred iles distance Humboldt and Bonpland heard its noises day and night, like e discharges of a battery, during the explosion of 1803.

A second line of volcanic action, upon as gigantic a scale as the preceing, commences at one of the most western points of North America, the eninsula of Alaska, in latitude fifty-five degrees. It pursues a western ourse for about two hundred geographical miles, embracing the Aleutian les, and reaching to the opposite coast of Kamschatka. Throughout the hole of this tract earthquakes are of frequent occurrence, and the bed of e sea and the surface of the land are often altered by their tremendous iolence. Seven active volcanoes are found at the southern extremity of the eninsula of Kamschatka, and thence the chain trends to the Kurile isles, here nine more are known to have been in eruption. Still southerly, the ne extends to the Japanese group, where there are a considerable number, nd where the disruption of the surface of the land in some districts is almost cessant, and sometimes violent. Passing the tropic of Cancer, the range mbraces the Loo Choo archipelago, the Philippine and Ladrone islands, nd is prolonged south to New Guinea. Here it branches off in a vast ansverse line, extending on the one hand into the heart of the Pacific, and n the other through Java and Sumatra into the bay of Bengal.

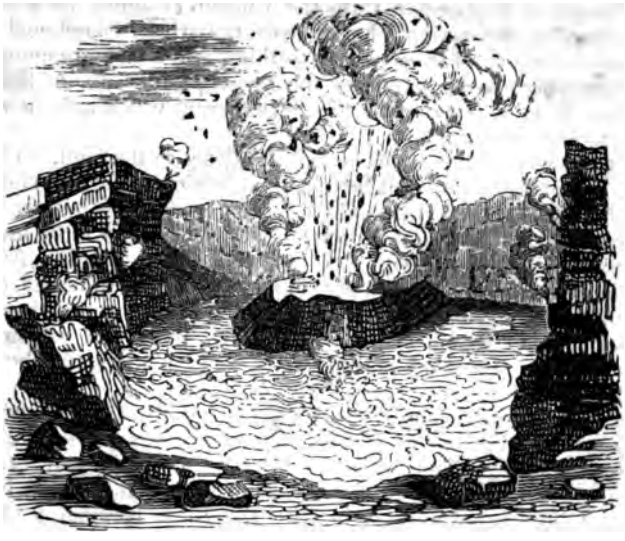
A third chain traverses the whole of the southern part of the European continent, a distance of above a thousand geographical miles. It commences at the Azores, and extends to the Caspian sea, having for its northern boundaries the Tyrolean and Swiss Alps, and for its southern bounds the northern kingdoms of Africa. This district has frequently been visited with earthquakes, those of Lisbon and Calabria causing the whole continent to vibrate at the shock. Etna, Vesuvius, and Stromboli, are at present the chief active vents, but anciently Vesuvius was in a state of torpor, and the island of Ischia was the scene of volcanic explosion. This small spot, about eighteen miles in circumference, now containing a population of twenty-five thousand, was frequently abandoned by its inhabitants on account of its violent convulsions. Before the Christian era, the Erythreans, the Chalcidians, and a colony established by Hiero, king of Syracuse, were successively driven from it. Ischia, however, sunk into repose, which has not since been disturbed, with one exception only, when Vesuvius, in the year 79, burst forth from the stillness of ages, and overwhelmed the cities of Herculaneum and Pompeii with its ashes. The eruptions of Etna are mentioned as occurring from the earliest periods to which history and tradition extend. Thucydides speaks of three between the colonization of Sicily by the Greeks and the commencement of the Peloponnesian war in the year B. C. 431. It was a fable of the Greek mythology, that the giant Typhos was confined beneath Sicily, his outstretched limbs extending under the Italian peninsula, and the terrible natural phenomena of the region were assigned to the struggles of the imprisoned monster. Pindar, in his first Pythian ode, says: "The sea-girt heights above Cuma, and Sicily too, press upon his shaggy breast: and the pillar of heaven, snowy Etna, the perennial nurse of sharp pinching snow, holds him fast. From the recesses of Etna are vomited forth the purest streams of fire, immeasurable in extent. By day the fiery current pours forth a burning torrent of smoke, but by night the red flame, rolling along masses of rock, plunges them with loud crash into the surface of the sea. That monster sends up such horrid streams of Hephæstus (Vulcan)—a sight wonderful to look on; wonderful, too, to hear of from those who have seen it." Etna, when viewed from a distance, appears a very symmetrical cone, but there are upward of eighty minor yet conspicuous cones upon its sides. At the last eruption, which occurred in November, 1832, the mountain sent forth a stream of lava eighteen miles long, including its windings, a mile broad, and thirty feet thick, which approached within two miles of the town of Bronte, and threatened it with destruction.

In addition to this general outline of extensive volcanic regions, there are isolated spots where similar phenomena are displayed. The peak of Teneriffe, in the Canary islands, is an imposing volcano, with its highest crater apparently sealed up, but lateral eruptions are of recent date. Iceland, Jan Mayen, and the south coast of Greenland, constitute a considerable volcanic system.

Eruptions of these volcanoes project an immense amount of material and with prodigious force.

Vesuvius—of which a view of the crater is annexed as it appeared in 1829—at its first recorded eruption, in A. D. 79, ejected scoriæ and ashes vastly exceeding its own bulk, which buried for ages Herculaneum and Pompeii: and its eruptions continued to be of the same nature for more than a thousand years, the first observed flow of lava occurring in the year 1066. Ashes from its summit have repeatedly fallen at Constantinople, in Egypt, and in Syria: and among its peculiarities the emission of boiling water from its flanks has been often remarked. This is not uncommon with reference to transatlantic

volcanoes, together with torrents of mud—a compost of water and ashes—forming a fetid clay. The power exerted by volcanic agency may be estimated by the amount of matter protruded, by the distance to which masses



The Crater of Vesuvius in 1829.

of rock have been projected, and by calculating the force requisite to raise lava to the tops of existing craters from their base. Vesuvius hurled stones eight pounds in weight to Pompeii, a distance of six miles, and has cast similar masses 2,000 feet above its summit, while Cotopaxi has projected a block of one hundred and nine cubic yards in width an immense distance.

It is obvious that the matter ejected by volcanic action must be brought up from an immense depth, or a single volcano would soon become exhausted, as the lava of one eruption frequently exceeds in amount what the whole mountain melted down could supply. The lava of Etna in 1669 covered eighty-four square miles; and in 1660 the amount disgorged by the mountain was equal to twenty times its entire mass. The most prodigious masses accumulated by volcanic action, have, however, transpired in Iceland, of which we have the following record of eruptions, since its first colonization by the Norwegians at the commencement of the tenth century:—

From Hecla, since the year	1004	22
From Kattlagiaa Yokul	900	7
From Krabla	1724	4
In different parts of the Guldbringe Syssel	1000	3
At sea	1583	2
From the lake Grimsratin, in	1716	1
From Eyafialla Yokul	1717	1
From Eyrefa Yokul	1720	1
From Skaptar Yokul	1783	1

To the above list must be added the eruption of Hecla during 1845, which rivalled any of its former displays. On the night of September 2d, the largest of the Orkney islands was covered with fine ashes, resembling ground pumice-stones, during a violent storm. It was at once supposed that Hecla had been in eruption, though four hundred miles distant, as the wind blew

from that quarter, and the ashes were volcanic. The surmise was afterward confirmed by the statement, that the mountain, after reposing between sixty and seventy years, had again resumed its explosions, bursting asunder in two places at mid-day on September 2d, and vomiting masses of molten matter.

On the night of September 15th, the volcano resumed its activity, with loud subterranean detonations, heard over the whole island, and lava was projected to a distance of from twenty to thirty miles, killing numbers of cattle, and destroying a large extent of the finest pasturage. At the distance of two miles from the mountain, the fiery torrent was a mile in width, and from forty to fifty feet in depth.

Nor is the action of volcanoes confined entirely to the land. The bed of the ocean is not unfrequently affected by volcanic action, and violent catastrophes sometimes occur. The sudden formation of new islands, the result of submarine volcanic action, constitutes a distinct class of those mutations to which the oceanic realm is subject. Some of these islands, after a hasty start into existence have subsided, and either entirely disappeared, or become shoals slightly depressed below the level of the water, while others have remained permanent. Some also have consisted merely of volcanic matter, while others have presented marine strata, and been literally the upheaved floor of the sea.

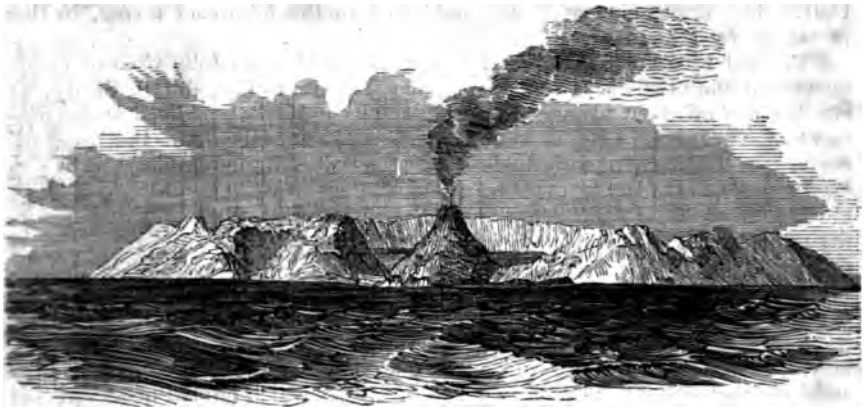
The gulf of Santorin, one of the Cyclades, in the Grecian archipelago, nearly encloses several small islands which have emerged from the deep within the period of authentic history. Rather more than a century before the Christian era, the small isle of Palaia Kameni was thrown up in the gulf. In the year 1573 another appeared, called the Little Kameni, a large disengagement of vapor, and the discharge of pumice accompanying its elevation, and telling the story of its birth. A third was formed in the years 1707 and 1709, called the New Kameni, which still exhales sulphureous vapors. These islands consist of volcanic products, lava, scoriæ, and pumice, and of strata uplifted by the expansive force which produced the ejection of these materials.

Similar instances have repeatedly happened in connexion with the Azores. The first on record is that mentioned by Kircher in 1538; another took place in 1720; and a third in 1587, when an earthquake shook the island of St. George, and eighteen small islets rose in the ocean near its shores. The last example in this locality, and the most celebrated, occurred in 1811, when the temporary island of Sabrina rose from the deep, off the coast of St. Michael.

A dangerous shoal was first thrown up from a depth of two hundred and forty feet of water. This took place in February. On the thirteenth of June the island showed itself above the surface of the sea, and continued rapidly to increase for several days, till it attained the height of three hundred feet, and was about a mile in circumference. It had a beautiful crater, with an opening thirty feet wide, from which hot water poured into the sea. In the month of October of the same year the island began gradually to disappear, and by the end of February, 1812, no trace of it was visible above the waves, though vapors occasionally rose from the spot. Mr. Bakewell states, upon the authority of a person who visited the Azores in 1813, that there was nearly five hundred feet of water at the place where Sabrina formerly had stood.

Barren island, in the Indian ocean, is one of the most remarkable volcanic islands now in active existence; the cone, situated nearly in the centre of the island, emits vast volumes of smoke, and showers of red-hot stones, some of which weigh three and four tons, and are cast to a distance of some hundreds of yards beyond the base; a scanty vegetation finds a precarious existence

on the outer ridges, often blasted by the violence of the eruptions: it is about six leagues in circumference, and may be distinguished from the rest of the Andaman islands for a distance of thirty-six miles in clear weather; the base of the cone or crater is but very little higher than the level of the ocean, although the cone itself rises abruptly to the height of 1,800 feet; it is surrounded by a wall of nearly equal height, which drops almost perpendicularly into the sea. At a quarter of a mile from the shore there is no bottom found at 150 fathoms.



Barren Island.

Among the Aleutian isles, a group in the north Pacific, stretching from Asia to North America, which consist of black masses of lava, rising perpendicularly from the sea, and peering above the clouds, a new island arose in 1806, which has remained firm. Its general form was that of an immense peak, studded with small conical hills, upward of four geographical miles in circumference. Another new isle was here produced in 1814, which rose up to the height of three thousand feet, then slightly subsided, and has firmly established itself as a member of the Aleutian group.

In 1783, an island was formed by elevation at the distance of seventy miles from Cape Reykiawas in Iceland. This was attended by the ejection of such an immense quantity of pumice, that the surface of the ocean was covered with it to the distance of a hundred and fifty miles, and the spring ships were considerably impeded in their course. The island consisted of high cliffs, and emitted fire, smoke, and pumice, from two or three different points. It was claimed by the king of Denmark, who denominated it Nyöe, or the New island, but before a year had elapsed, the sea resumed its ancient domain, a rocky reef remaining under the surface at the spot where this portentous production had appeared. The submarine eruption was a prelude to some of the most violent convulsions that have marked the annals of Iceland. After repeated shocks of earthquakes, the Skaptar volcano was roused into terrific activity, and threw out the largest body of lava ever witnessed since the period of authentic records. The quantity of ashes was so great as to affect the whole European atmosphere with obscurity, and in the Faroe islands the ground was everywhere covered with particles of sand and pumice. The great earthquake in Calabria which occurred in the same year—the luminous meteors observed in England, Holland, and various parts of the continent—the fog which covered Europe from north to south, rising above

the summits of its highest mountains, and continuing upward of a month—render 1783 one of the most remarkable years of modern times.

Such was the destruction of pasturage, corn-fields, and property, in Iceland, caused by its physical convulsions at this period, as to bring upon its inhabitants the additional miseries of famine, so that in the short space of two years, not fewer than 9,336 human beings, 28,000 horses, 11,461 head of cattle, and 190,488 sheep, perished on the island.

The most recent instance of new formations of this class, which excited extraordinary interest from its locality, occurred off the coast of Sicily in 1831. The first notice of it was published in the following terms, in the *Messager des Chambres*:—

"Toward 11 o'clock on the tenth of July, 1831, Captain John Corrao, commander of the brig Thérésine, going from Trapani to Girgenti, in Sicily, at the distance of about twenty miles from Cape St. Mark, perceived at the distance of a gunshot a mass of water, which rose sixty feet above the level of the sea, and presented a circumference of nearly four hundred fathoms; a smoke proceeded from it, exhaling an odor of sulphur. The preceding day, in the gulf of *Trois Fontaines* (Three Fountains), he had seen a great quantity of dead fish and of black matter floating on the water, and he heard a noise like that of thunder, which the captain attributed to a volcanic eruption. He continued his voyage to Girgenti; and all the time that he was occupied in lading his ship, he saw a thick smoke rise incessantly from the same point, before which he arrived on the 16th, on his return from Girgenti. A new spectacle was then presented to him, namely, a tract of land, of the same circumference as that of the mass of water which he had observed on his first voyage. This island, which we shall call Corrao, from the name of him who saw it formed, is elevated twelve feet above the level of the sea; it has in the middle a kind of plain, and the crater of a volcano, whence a burning lava is seen to proceed during the night. The island is bordered by a girdle of smoke; the sounding all around the island gives a depth of one hundred fathoms; the latitude thirty-seven degrees, six minutes, north, and longitude ten degrees, twenty-six minutes, east, from the meridian of Paris."

Dr. Turnbull Christie, writing to Professor Jameson from Malta, July 23, observes: "It would appear that the volcano commenced on the 11th instant, when it was seen by the master of a small vessel sailing toward Terra Nova, who describes it as having had the appearance of a large rugged island, coming up and falling with force back into the sea, so that the sea flew up to a great height, and fell down in the form of foam. This was seen to be repeated at short intervals, for nearly two hours. The masters of two small vessels, one from Sardinia, and the other from Palermo, state: 'On the 13th instant, about 2 o'clock, P. M., being between Sciacca and Pantellaria, twenty-five miles southward of Sciacca, we discovered three columns of smoke, apparently issuing from the sea. On approaching it we heard a great noise, like the rolling of the wheels of a steam-vessel.' The admiral on the Mediterranean station, Sir H. Hotham, immediately despatched an officer to examine and ascertain the exact position of the new volcanic island, which was named Hotham island in honor of the commander and the following interesting particulars were reported:—

"On the 18th of July, at four, P. M., the town of Marsala bearing by compass east half north, nine miles, I observed from on board his majesty's sloop Rapid, under my command, a highly irregular column of very white smoke or steam, bearing south by east. I steered for it, and continued to do so till a quarter past eight, P. M., when, having gone about thirty miles by the

eckoning, I saw flashes of brilliant light mingled with the smoke, which was till distinctly visible by the light of the moon.

"In a few minutes the whole column became black and larger; almost immediately afterward several successive eruptions of lurid fire rose up amid the smoke; they subsided, and the column then became gradually white again. As we seemed to near it fast, I shortened sail and hove to till daylight, that I might ascertain its nature and exact position. During the night the changes from *white* to *black*, with flashes, and the eruption of fire, continued at irregular intervals, varying from half an hour to an hour. At daylight I again steered toward it, and about five, A. M., when the smoke had for a moment cleared away at the base, I saw a small hillock of a dark color, a few feet above the sea. This was soon hidden again, and was only visible through the smoke at intervals between the more violent eruptions.

"The volcano was in a constant state of activity, and appeared to be discharging dust and stones, with vast volumes of steam. At half-past seven the rushing noise of the eruptions was heard. At nine, being distant from it about two miles, and the water being much discolored with dark objects at the surface in various places, I hove to, and went in a boat to sound round and examine it. I rowed toward it, keeping on the weather-side, and sounding, but got no bottom till within twenty yards of the western side, where I had eighteen fathoms, *soft bottom;* this was the only sounding obtained, except from the brig, one mile true north from the centre of the island, where the depth was one hundred and thirty fathoms, *soft dark-brown mud.* The crater (for it was now evident that such was its form) seemed to be composed of fine cinders and mud of a *dark-brown color;* within it was to be seen, in the intervals between the eruptions, a mixture of muddy water, steam, and cinders, dashing up and down, and occasionally running into the sea, over the edge of the crater, which I found, on rowing round, to be broken down to the level of the sea, on the west-southwest side, for the space of ten or twelve yards. Here I obtained a better view of the interior, which appeared to be filled with muddy water, violently agitated, from which showers of hot stones or cinders were constantly shooting up a few yards, and falling into it again; but the great quantity of steam that constantly rose from it prevented my seeing the whole crater.

"A considerable stream of muddy water flowed outward through the opening, and, mingling with that of the sea, caused the discoloration that had been observed before. I could not approach near enough to observe its temperature; but that of the sea, within ten or twelve yards of it, was only one degree higher than the average; and to leeward of the island, in the direction of the current (which ran to the eastward), no difference could be perceived, even where the water was most discolored; however, as a 'mirage' played above it near its source, it was probably hot there. The dark objects on the surface of the sea proved to be patches of small floating cinders. The island or crater appeared to be seventy or eighty yards in its external diameter, and the lip as thin as it could be consistent with its height, which might be twenty feet above the sea in the highest, and six feet in the lowest part, leaving the rest for the diameter of the area within. These details could only be observed in the intervals between the great eruptions, some of which I witnessed from the boat. No words can describe their sublime grandeur. Their progress was generally as follows: After the volcano had emitted for some time its usual quantities of white steam, suddenly the whole aperture was filled with an enormous mass of hot cinders and dust, rushing upward to the height of some hundred feet with a loud roaring noise, then falling into the sea on all sides with a still louder noise, arising in part, per-

haps, from the formation of prodigious quantities of steam which instantly took place. The steam was at first of a brown color, having embodied a great deal of dust; as it rose it gradually recovered its pure white color, depositing the dust in the shape of a copious shower of muddy rain. While this was being accomplished, renewed eruptions of hot cinders and dust were quickly succeeding each other, while forked lightning, accompanied by rattling thunder, darted about in all directions, within the column, now darkened with dust and greatly increased in volume, and distorted by sudden gusts and whirlwinds. The latter were most frequent on the lee side, where they often made imperfect water-spouts of curious shapes. On one occasion some of the steam reached the boat; it smelt a little of sulphur, and the mud it left became a gritty, sparkling, dark-brown powder when dry. None of the stones or cinders thrown out appeared more than half a foot in diameter, and most of them much smaller.

"From the time when the volcano was first seen till after I left it, the barometer did not fall or rise; the sympiesometer underwent frequent but not important changes; and the temperature of the sea did not bespeak any unusual influence. After sunset, on the 18th, soundings were tried for every hour, to the average depth of eighty fathoms; no bottom. The wind was northwest; the weather was serene. On the forenoon of the 19th, with the centre of the volcano bearing by the compass south by west half west, one mile distant, good sights, for the chronometer gave longitude twelve degrees, forty-one minutes, east; and at noon on the same day, when it bore west by north half north by compass, the meridian altitude of the sun gave the latitude thirty-seven degrees, seven minutes and a half, north; an amplitude of the sun the same morning gave the variation of a point and a half westerly. It is worthy of remark, that on the 28th of June last, at half-past nine, P. M., when passing near the same spot with the Britannia, several shocks of an earthquake were felt in both ships."

These records of modern change and convulsion are highly instructive, and may be regarded as relating the story of many formations which have marked the superficies of the globe for ages, transpiring before history commenced its

Island of St. Eustatia, West Indies.

annals, or physical phenomena had any intelligent human witness. Whole groups of islands bear evident marks of having been formed by volcanic activity,

consisting either wholly of an accumulation of volcanic substances, or in connexion with marine strata upheaved from the bottom of the sea. A great number of solitary islets likewise display the same character, and have been built up by the occurrence of violent catastrophes. The south Atlantic presents a remarkable example of this class in Ascension island, one of the most isolated solid sites above the waves of the ocean, one thousand four hundred and fifty miles from the coast of Africa, six hundred and eighty-five from St. Helena, and five hundred and twenty from the nearest particle of visible land, the island of St. Matthew. Its shore exhibits black nitrous lava. Its surface presents rugged conical hills of different kinds of lava, some with perfect craters, scoriæ, pumice, and other volcanic products being everywhere strewed in large quantities. Not a shrub was to be seen upon its first discovery on Ascension-day, in 1501, by Joãn de Novo Galego, and the only vegetation consisted of some coarse grasses and ferns. There can be little doubt respecting the events denoted by the physical characteristics of this island. Probably the ocean here once rolled its waters unobstructed by any visible land, when, at some era in the past which no chronicle has marked, a grand revolution took place, from the action of that power which in recent times has invaded the dominion of the sea, and reared rocky edifices beyond the reach of its waves. The disturbing cause at length expended its energy, as it has done with reference to the peak of Teneriffe, and the extinct volcanoes of Auvergne, and an age of tranquillity ensued, marked by the ordinarily gradual and quiet operations of nature. Each of the existing continents furnishes innumerable proofs of having undergone similar grand revolutions, proceeding from some expansive power which has lifted up, broken, and overturned their masses in a thousand ways. The lowest and most level parts of the earth, says Cuvier, when penetrated to a very great depth, exhibit nothing but horizontal strata composed of various substances, and containing, almost all of them, innumerable marine productions. Similar strata, with the same kind of productions, compose the hills even to a great height. Sometimes the shells are so numerous as to constitute the entire body of the stratum. They are almost everywhere in such a perfect state of preservation, that even the smallest of them retain their most delicate parts, their sharpest ridges, and their finest and tenderest processes. They are found in elevations far above the level of every part of the ocean, and in places to which the sea could not be conveyed by any existing cause. The summits of the Pyrenees and of the Andes, at the height of 13,000 or 14,000 feet above the level of the sea, present them to our notice. These facts bear witness to the great and wonderful changes which have marked the ancient history of the earth; for it is obvious that the present continents once occupied a submarine position, from which they have been uplifted—a change analogous to that involved in the formation of new islands by a process of elevation, and probably brought about by the same agency, though acting with an incomparably greater energy.

Fatal to human life as the eruptions of the volcano have occasionally been, large views of such physical events will awaken impressions at variance with those which their detached observation often excite. He who, living on the slopes of Vesuvius, witnesses his vine-clad dwelling, or his native village, overwhelmed with the lava and ashes of the mountain, is apt to become exclusively occupied with the disaster, and will not readily reflect upon the many millions of mankind who enjoy a quiet habitation, and whose locality has never been disturbed within the period that history and tradition have chronicled such occurrences. Yet nothing is more true than that the same agency which is occasionally destructive in a few spots upon the world's ex-

panse, has operated in forming or upheaving the universal crust of the globe, and has thus been the means of building up sure resting-places for unnumbered myriads of the human family. It is that protruding or elevating power also that has rendered the coal formations and mineral veins accessible, and thus supplied commerce with its sinews; and comparing the physical history of the globe with the career of its inhabitants, how harmless the Etnas and Cotopaxis of nature appear, in contrast with the Cæsars and Napoleons of mankind! A slight survey of the features of the external world is sufficient to show, that the tendency of their general arrangement is to minister to the happiness of man, to give him pleasure in the act of contemplation, as well as to contribute to his convenience. Its surface, so finely diversfied, is eminently calculated for the gratification of its occupiers, and expands around them in every clime an array of beauty and grandeur, sometimes apart from each other, but often blended in wild yet tasteful and imposing combinations. Wherever the traveller penetrates, he finds the terrestrial configuration so arranged in ever-varying outline, as to spread before him an inviting picture of natural scenery, which captivates, or soothes, or elevates, or excites the mind, and furnishes such pleasurable emotions as dull uniformity would not have yielded. Especially do the elevations which mark the face of the earth, whether rising to the stately proportion of mountains, or forming only the rounded, green-clad hill, give interest, grace, or sublimity, to the landscape. But the mountains perform a more important office than that of giving imposing effect and picturesque beauty to the scenery of the earth. Occupying a portion of its surface nearly equal to that which the sandy desert claims, they stand associated with political and other results of the highest importance to mankind. Where the ocean does not extend its waters to divide the families, kindreds, and tongues of the human race, the granite snow-crowned rampart is frequently the line of demarkation. Nations have thus been kept apart from each other by natural boundaries; and the difficulties connected with aggressive wars between communities thus separated, have contributed to promote peace and maintain independence. The mountains also give their aid to the clouds of heaven, attracting them to their summits, and storing up their precipitated waters in interior reservoirs, whence they issue by a thousand springs; and in the dens and caves that perforate their declivities liberty and religion have often found a secure asylum, when assailed by persecuting power and grasping ambition. "The precious things of the lasting hills"—the phrase of the dying Hebrew patriarch—is not without its appropriate significancy.

Grotte des Fromages.

SUBJECT IX.

CAVERNS AND SUBTERRANEAN PASSAGES.

HEN we reflect upon the manner in which the solid crust of the earth appears to have been formed, upon the powerful upheaving force by which its elevated sites have been raised, and the posterior agency of subterranean gases, volcanoes, and earthquakes, it is natural to expect chasms in the surface of tremendous depth, spaces also in the interior which have not been filled up with masses of stone similar to the materials of the earth itself, but by water, air, or vapor, with those cavities of grotesque and romantic appearance that are found in mountainous regions. There are few natural objects which have more awakened curiosity, or more strongly affected imagination, than the hollow places, of various forms and sizes, common districts which have been subject to great physical disturbance. Their lusion and gloom—their fantastic architecture—the effect of torch-light on their numerous crystallizations—the augmentation of sound and its reberation—together with their unknown extent in many cases—all these ses contribute to invest the cavities of the earth with exciting interest; r is it strange to find them interwoven with the traditions and mythologies unenlightened nations. On account of their sombre interior and strange tline being adapted to impose upon an ignorant populace, and give effect religious observances, the priesthoods of antiquity localized in caverns their se divinities, and celebrated sanguinary rites upon the natural altars found their recesses. A cave, with a priestess seated upon a tripod at its mouth, stending to inhale a vapor from the interior which inspired a knowledge future events, the gift of Apollo, was the original Delphian oracle, revenced by the mind of Greece, and resorted to by the proudest monarchs of e ancient world. The cavern, along with the deep forest, commended elf to the primitive inhabitants of northern Europe by its mystery and oom, as an appropriate spot for the performance of a barbarous worship, d many local titles of such sites preserve the memory of their former uses n instance of this we have in Thor's cave, or, as Darwin calls it,

"The blood-smeared mansion of gigantic Thor,"

broad excavation on the face of a huge rock in the limestone district of erbyshire, divided into two chambers, one beyond the other, with a dched stone at the further extremity, where the light of day is very much bdued. But in India the largest use has been made of caverns for reli ous purposes, and immense pains have been taken with their adornment, tension, and architecture, at Elephanta, Salsette, and Ellora, where there e elaborately-wrought temples constructed, probably out of small natural evices in the rock. We shall now refer to a few of those cavities which

are entirely the workmanship of nature, with whose form man nas not inter meddled, and notice the principal phenomena which they exhibit.

The Cave of Elephanta.

That extensive cavities exist in the interior of the crust of the globe is evident from the phenomena of volcanoes and earthquakes. They are not accessible to observation, but the repeated tremblings of the soil in various places, and experiments made of oscillations of the pendulum, point to the conclusion, that there are large underlaying hollows, at no great distance from the surface, of which the superficial land forms the roof. The table-land of Quito, and the burning mountain of Jorullo, each surrounded by the most powerful volcanoes upon the earth, are supposed to be examples of this. Condamine believed that a considerable portion of the former mountain was to be regarded as the dome of an enormous vault; and Parrot has shown it to be highly probable, by a careful calculation, that a cavity of at least a cubic mile and a half exists beneath its surface. The rumbling noise, like that of distant thunder, which, on the testimony of Humboldt, usually precedes and accompanies the eruption of its volcanoes, affords evidence in favor of this supposition, and as an increase of the subterranean vacuity must be the necessary consequence of every outbreak, it is not at all an improbable event that the blooming landscape will ultimately fall in, and this piece of table-land become an immense depression. The quantity of material scooped out of the interior of the earth by volcanic action is immense, and calculated to produce vacuities in which the largest mountains would have ample space. It has been estimated that Etna, in one of its last most important eruptions, that of 1769, threw out a mass of lava equal in volume to a cone 5,820 feet in height, and 11,640 feet in breadth, or nearly four times larger than Vesuvius. Fourteen such eruptions would produce a mass equal to Mont Blanc, reckoning from the level of the sea, and twenty-six such large eruptions have occurred since the twelfth century. In 1783, when the earthquake of Calabria occurred, the Skaptar volcano, in Iceland, poured forth a stream of lava fifty miles long, between twelve and fifteen broad, and from

) to six hundred feet in thickness, which must have been equal to six es the mass of Mont Blanc, and two and a half times that of Chimborazo. From the discovery of America to 1759, the plain of Malpais, a volcanic trict in Mexico, had remained undisturbed, and was covered with planta- ns of indigo and sugar-cane at the latter period. In June, a succession of thquakes commenced, and on the night of September the 28th a tract not s than from three to four miles in extent, rose up in the shape of a dome; l six great masses suddenly appeared, having an elevation of from 1,312 1,640 feet above the original level of the plain. The most elevated of se is the volcano of Jorullo, which is continually burning, the projection of ich, with its kindred masses, must have created a considerable subterra- n vacuity, and probably the whole dome-shaped plain of Malpais is hollow. nce, it is a common event, in countries subject to great volcanic activity portions of the surface to fall in, the subsidence frequently becoming the l of a lake. A part of the forest of Aripas in the Caraccas thus subsided in 0; a lake was formed nearly half a mile in diameter, and from eighty to undred yards in depth, and for several months after the trees of the forest nained green under the water. In the same year, in Sicily, at Santa Ma- de Nisremi, a portion of the country three Italian miles in circumference k thirty feet deep. Occurrences of the same kind appear to take place the depth of the sea, the falling in of its bed being indicated on the sur- e of the waters by their sudden retreat, and violent agitation on their urn. A remarkable example of this phenomenon took place at Mar- lles, on June 28, 1812, when the water in the harbor suddenly sank, then hed out with great rapidity, and returned with equal violence; a move- nt which was repeated several times, till the equilibrium was restored, asioning considerable damage to the shipping. Instances of similar events innumerable, which serve to prove the existence of cavities, both in the erior of the expost crust of the earth, and those parts of it over which the ean rolls.

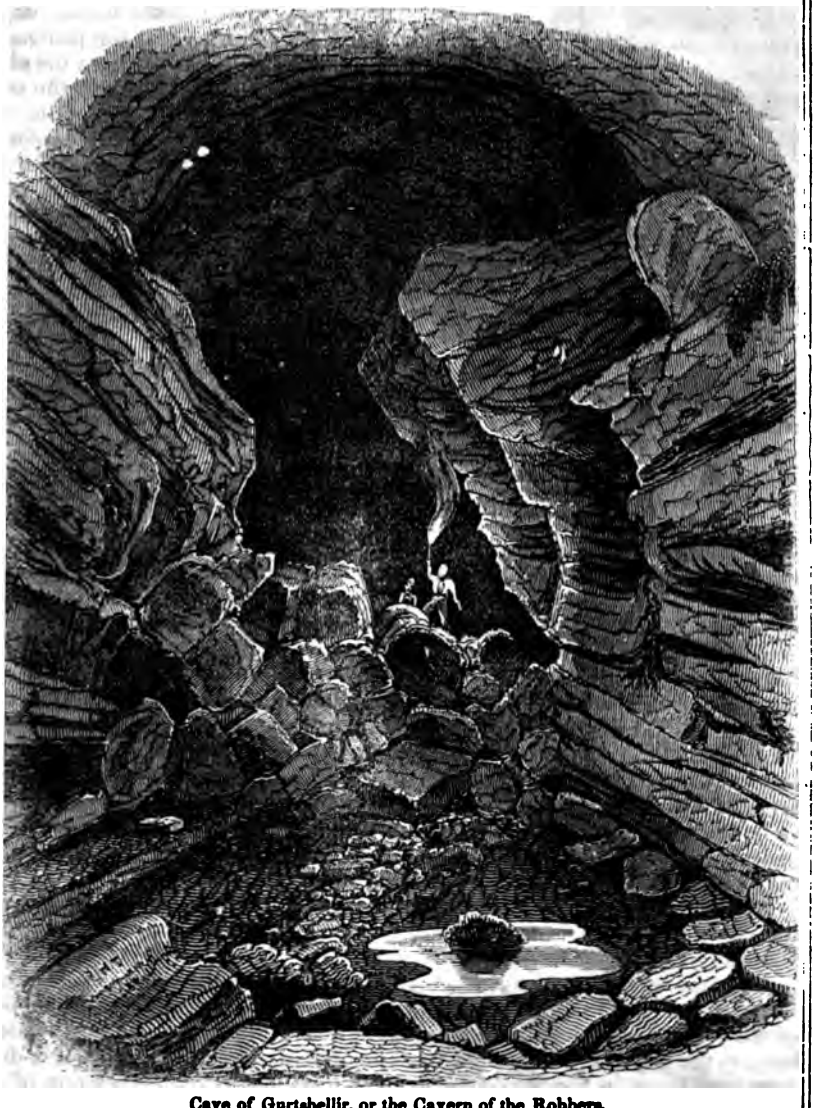
To Humboldt we are indebted for a large amount of information respect- the cavities which appear upon the surface, the chief differences of their m, the beds in which they are found, and the causes which may have ori- ated them. In the primary rocks, caverns are relatively fewer than in later deposites, while the oldest masses of the granite and gneiss forma- ns are particularly destitute of them. The principal are wide fissures, netimes of unknown depth, and those hollow passages which occur in ritzerland and Dauphiné, called crystal caves, owing to their walls being hly furnished with pillars of rock crystal. Similar vacuities occur in the eiss of the Pine mountain in the neighborhood of Wiesenthal, but they are t important. In Sweden and Norway, the granite presents fissures and ves of extraordinary extent, and perfectly unexplored hitherto; such as the ve of Marienstadt, the end of which is not known, and the enormous deep le at Frederickstall, where a stone thrown in only gives the echo of its fall a minute and a half or two minutes; an observation which, if well found- , would give, on the calculation of Perrit, a precipitous depth of 59,049 et, the highest estimate, or 39,866 feet, the least; that is, from twice to ree times the height of Chimborazo. It is the primitive limestone that pplies the most numerous examples of caves and grottoes in the primary cks; and if these yield in point of size to the later limestone formations, s arises from the inferior extent of the primitive limestone, rather than m its incapacity to form caves. In the transition mountains, and those of atified structure, it is still the limestone in which the more extensive caves e found of which those of the Hartz, the splendid caverns of Derbyshire,

and those of the Carpathians, are well known. Caverns most frequently occur in the mountains of stratified limestone; and among these, one of the most modern formations, the Jura limestone, is particularly distinguished, and was therefore termed the cavern-limestone by the early geologists. The celebrated caves of Franconia, the grotto of Notre Dame, between Grenoble and Lyons, the caves of Westphalia, and that of Kirkdale, in Yorkshire, occur in this formation. Next to the limestone in the stratified formations, the so-called older gypsum which contains salt is the most abundant in caverns. They are of rare occurrence in the sandstone, have generally broad openings but of no great extent. Such are the Cow-stall in Saxony, and a few caves in Bohemia.

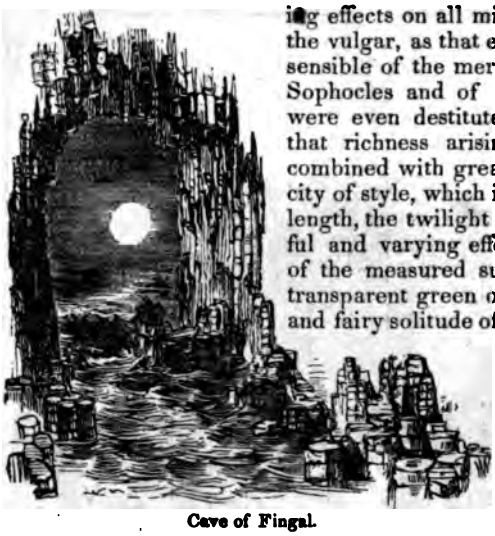
In the volcanic rocks, cavern formations are very common, and one of the most splendid examples in the world occurs in the basalt, a rock of comparatively modern igneous origin. This is the well-known cave of Fingal, in the island of Staffa, a small island on the western coast of Scotland, composed entirely of amorphous and pillared basalt. The name of the island is derived from its singular structure, Staffa signifying, in the Norwegian language, a people who were early on this coast, a staff, and figuratively a column. The basaltic columns have in various places yielded to the action of the waves, which have scooped out caves of the most picturesque description, the chief of which are the Boat cave, the Cormorant cave, so called from the number of these birds visiting the spot, and the great cave of Fingal.

Distant View of Staffa.

It is remarkable that this grand natural object should have remained comparatively unknown, until Sir Joseph Banks had his attention accidentally directed to it, and may be said to have discovered it to the inhabitants of south Britain. This great cavern consists of a lava-like mass at the base, and of two ranges of basaltic columns resting upon it, which present to the eye an appearance of regularity almost architectural, and supporting an irregular ceiling of rock. According to the measurements of Sir Joseph Banks, the cave from the rock without is three hundred and seventy-one feet, six inches; the breadth at the mouth, fifty-three feet, seven inches; the height of arch at the mouth, one hundred and seventeen feet, six inches; depth of water at the mouth, eighteen feet; and at the bottom of the cave nine feet. The echo of the waves which wash into the cavern, has originated its Gaelic name, Llaimh-binn, the Cave of Music. M'Culloch remarks: "If too much admiration has been lavished on it by some, and if, in consequence, more recent visiters have left it with disappointment, it must be recollected, that all descriptions are but pictures of the feelings of the narrator; it is, moreover, as unreasonable to expect that the same objects should produce correspond-



Cave of Gurtshellir, or the Cavern of the Robbers.



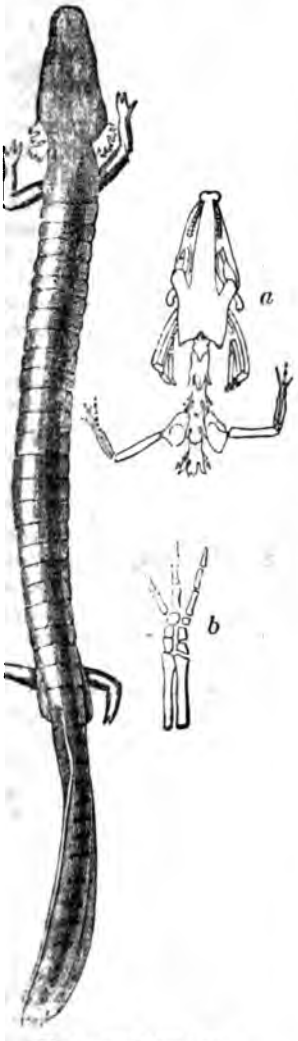
Cave of Fingal.

ing effects on all minds, on the enlightened and on the vulgar, as that every individual should alike be sensible of the merits of Phidias and Raphael, of Sophocles and of Shakspere. But if this cave were even destitute of that order and symmetry, that richness arising from multiplicity of parts combined with greatness of dimension and simplicity of style, which it possesses; still the prolonged length, the twilight gloom half concealing the playful and varying effects of reflected light, the echo of the measured surge as it rises and falls, the transparent green of the water, and the profound and fairy solitude of the whole scene, could not fail strongly to impress a mind gifted with any sense of beauty in art or in nature, and it will be compelled to admit it is not without cause that such great celebrity has been conferred on the cave of Fingal."

Caverns occur in modern porphyry in the neighborhood of Quito, and even in modern lavas, the ejection of which has taken place within the memory of man. Flinders has made us acquainted with caves in the lava of the Isle of France; and in the lava of Vesuvius of 1805, Gay-Lussac found several upon a small scale. But caverns of an enormous extent occur in the lava of Iceland, that of Gurtshellir, situated in the torrent which has flowed from Bald yokul, being forty feet in height, by fifty in breadth, and nearly a mile in length. Beautiful black volcanic stalactites hang from the high and spacious vault, and the sides present a succession of vitrified horizontal stripes, a thick coating of ice clear as crystal covering the floor. Henderson, in particular, describes one spot, the grandeur of which surpassed all expectation, the light of the torches rendering it peculiarly enchanting. The roof and sides of the cave were decorated with the most superb icicles, crystallized in every possible form, many of which rivalled in minuteness the finest zeolites; while from the icy floor, rose pillars of the same substance, assuming all the curious and fantastic shapes imaginable, mocking the proudest specimens of art, and counterfeiting many well-known objects of animated nature. A more brilliant scene, says Henderson, perhaps never presented itself to the human eye, nor was it easy for us to divest ourselves of the idea that we actually beheld one of the fairy scenes depicted in Eastern fable.

Among the forms under which caverns present themselves, Humboldt distinguishes three principal kinds, which essentially differ from each other, notwithstanding all their apparent irregularities.

The first appear in the form of cracks or fissures, like empty veins of ore, of greater or less extent, but narrow and considerably prolonged, often penetrating far into the mountain, and only reaching the day at one end. Eldon hole, in the peak of Derbyshire, is a example of this class. This is a deep yawning chasm in the limestone strata, but no longer considèred one of the wonders of the region, as its presumed unfathomable depths have been satisfactorily measured. In the reign of Queen Elizabeth, the earl of Leicester is said to have hired a man to go down into it to ascertain its extent and form. The account of the adventure states, that he was let down about two hundred ells, and after he had remained at the length of the rope awhile, he



The Proteus Anguinus.

The Cupola Cavern.

was drawn up again, with great expectation of some discoveries; but he came up senseless, and died within eight days in a phrensied condition.

Eldon hole is a fissure about sixty feet long, twenty wide, and two hundred deep. In the Philosophical transactions for 1781, there is an account of the descent of Mr. Lloyd, who was let down with a rope by eight men, and found the light sufficiently strong at the bottom to allow him to read print. He discovered a fissure in the rock at the bottom, through which a strong current of air proceeded, but as the aperture was nearly filled up with huge stones, he could not examine it. A former owner of the pasture in which the chasm is situated, having lost cattle by falling into it, made the attempt to fill it up, and threw down many loads of stones without any visible effect, some of which were probably those which choked the aperture reached by Mr. Lloyd. The whole extent and actual depth of Eldon hole have not therefore been ascertained.

There is a second kind of caverns which are essentially distinguished from the first by the circumstance that they reach the daylight at both ends, piercing through the rocks in which they are situated, and forming natural shafts.

Their appearance is very remarkable when they occur on the top of isolated mountain-peaks, or of independent masses of rock; and when they are so straight that the daylight appears through them, they present a very remarkable aspect, and have been designated by the name of transparent caverns. On this account, the so-named Martin's hole is particularly celebrated. It penetrates the Tschingel-peak, one of the highest mountains of the Dodi chain; and twice in the year, in March and in September, the sun appears as if through a pipe, and gives to the valley beneath a highly singular and pleasing light. A similar phenomenon has been described by Pontoppidan as occurring in Norway, where there is a perforation of the mountain of Torghatten in Helgeland, of fifty fathoms in height, and a hundred fathoms in length, through which the daylight appears. Like phenomena present themselves at the hollow stone of Muggendorf; likewise in Saxon Switzerland, and a whole series of these perforations occur on the coast of the island of Heligoland, and on the coast of New Zealand.

The third and most frequent form of caverns is unquestionably that in which there is a series of extensions of nearly similar height and direction, which are connected with each other by passages of greater or less extent. This is the form of the caverns of the Hartz, the cave of Caripa visited by Humboldt, of Antiparos, and of the peak of Derbyshire. This is also the form of the more important caves of Franconia. The extent of these penetrations into the mountains, in particular of such as are situated in limestone, is often very extraordinary. In many of them the extremity has never been reached; and it appears from concurrent testimony that some of them have been explored for more than a mile in length. In this respect, the cavern or grotto of Adelsberg, about six miles from Trieste, is mentioned as the greatest of all, excelling all known caverns, not only in length, but in height. Deep abysses of five and six hundred feet often occur in it; and in one of these, it was found necessary to give up the attempt to proceed further. The entrance resembles a fissure in a huge rock caused by an earthquake. Here torches are always lighted to conduct visiters. The cavity itself seems as if divided into several large halls and other apartments. The vast number of pillars by which it is ornamented by nature gives it a superb appearance; for they are as white as snow, and have a kind of transparent lustre. The bottom is of the same material; so that a person may imagine he is walking among the ruins of some stately palace, amid noble

illars and columns, partly mutilated, and partly entire. From the top, parry icicles are seen everywhere suspended; in some places resembling ax tapers, which, from their radiant whiteness, appear extremely beautiul. Here occurs that extraordinary animal the proteus, in shape between a lizard and an eel, transparently white, with a tinge of rose color about he head. It adds, as Davy remarks, one instance more to the number aleady known of the wonderful manner in which life is produced and peretuated, even in places which seem the least suited to organized existenes—an animal to whom the presence of light is not essential, living indifferently in air and in water, on the surface of the rock, or in the depths of he mud.

Of an analogous kind is the Peak cavern in Castleton Dale, the approach o which is in the highest degree magnificent. The traveller passes through a chasm between two ranges of perpendicular rocks having on his left a rivlet which issues from the cave, and pursues its splashing course over cragy and broken masses of limestone. A vast mass of rock suddenly appears efore him, with the mouth of the cavern, which assumes the form of a deressed arch, a hundred and twenty feet in width, forty-two in height, and bout ninety in receding dêpth. At the first entrance, a spectator is surrised to find that a number of twine-makers have established their residence nd manufactory within this gulf; and their rude appearance and machines ingularly combine with the sublime features of the natural scenery. After roceeding about thirty yards, the roof becomes lower, and a narrow passage s reached, where the blaze of day, which has been gradually softened into wilight, wholly disappears, and all further researches must be prosecuted by orchlight. After penetrating twenty or thirty yards in a stooping posture, here is a spacious opening, beyond which is the margin of a small lake called he First Water, the overhanging rock descending in one place to within twenty inches of its surface. The lake is crossed in a boat or skiff, partly filled with straw, in which the passenger lies down, and is conveyed to the other side, where a spacious vacuity opens two hundred and twenty feet in length, two hundred feet broad, and in some parts one hundred and twenty feet high; but from the want of light, neither the roof nor the sides of this great cavity can be plainly discerned. Proceeding onward by the side of the Second Water, there is a projecting pile of rocks popularly called Roger Rain's house, on account of the water incessantly dripping from the crevices of the roof. Beyond this, another hollow opens, called the Chancel, where the rocks appear much broken, and the sides are covered with stalactical incrustations. Here the stranger is generally surprised by an invisible vocal concert, which bursts in wild and discordant tones from the upper regions of the cavern, where a group of women and children are stationed for the purpose, the inhabitants of some of the huts at the entrance. After leaving the Chancel, and passing the Devil's cellar, and the Half-way house, the path leads beneath three natural arches to another vast concavity, termed Great Tom of Lincoln, from its resemblance to a bell. Here, under the influence of a strong light, the arrangements of the rock, the spiracles in the roof, and the flowing stream, produce a striking scene. From this point the vault gradually descends, the passage contracts, and at length leaves only room sufficient for the stream.

The entire length of this great excavation is 2,250 feet, and its depth from the surface of the mountain, about 620. A striking effect is frequently produced by the explosion of a small quantity of powder, wedged into a crevice of the rock, the report of which rolls along the roof and sides like a heavy and prolonged peal of overwhelming thunder. On returning from this dark

recess, the effect of the light is singularly impressive. The rocks appear as if highly illuminated, and the plants and mosses upon them so vividly green, as to produce the impression that the sun must be shining brilliantly upon them, when the day is really dull and hazy. The Peak cavern is thus an example of a succession of great chambers connected together by narrow passages; and when we remember the soluble nature of the stone, and the stream that flows through it, there can be no doubt that, if not formed altogether by the action of water, it yet owes its present condition to that agency.

The GREAT KENTUCKY CAVERN is ten or twelve miles in length, with many extensive branches. The surrounding country is much broken into ravines and pits, at the bottom of one of which is the entrance. Mr. N. Ward, who explored this cavern, gives the following description of it:—

"At eight in the morning, I started with the guides, taking with us two large lamps, a compass, and something for refreshment, and entered the cave about sixty rods from the house, down through a pit forty feet deep and thirty in circumference: at the bottom is a spring of water. You are now at the entrance of the cave (A), which opens to the north, and is from forty to fifty feet high, and about thirty feet in width for upward of forty rods, when it becomes but ten feet wide and five feet high. However, this continues but a short distance, when it expands to forty or fifty feet in width, and is about twenty in height for about one mile, when you come to the *First hoppers* (B), where saltpetre is manufactured. Thence it is about forty feet in width and sixty in height, to the *Second hoppers* (B), two miles from the entrance. The loose limestone has been laid up into handsome walls on either side, almost the whole distance from the entrance to the Second hoppers: the road is hard, and as smooth as a flag pavement. The walls of the cavern are perpendicular in every passage that I traversed; the arches regular in every part, and have bid defiance even to earthquakes. One of my guides informed me he was at the Second hoppers in 1812, with several workmen, when those heavy shocks came on which were so severely felt in this country. He said that about five minutes before the shock, a heavy rumbling noise was heard coming out of the cave like a mighty wind; when that ceased, the rocks cracked, and all appeared to be going in a moment to final destruction. However, no one was injured, although large rocks fell in some parts of the cave.

"As you advance into the cave, the avenue leads from the Second hoppers west one mile, then southwest to the 'Chief city' (D), which is six miles from the entrance. This avenue is from sixty to one hundred feet in height, and about the same in width, the whole distance after you leave the Second hoppers, until you come to the cross-roads or Chief city, and is nearly upon a level; the floor, or bottom, being covered with loose limestone and saltpetre earth.

"After entering the Chief city, I perceived five large avenues leading out of it, from sixty to one hundred feet in width, and from forty to eighty in height. The walls (all of stone) are arched, and are from forty to eighty feet perpendicular height before the arch commences. The first which I traversed, after cutting arrows on the stones under our feet pointing to the mouth of the cave (in fact we did this at the entrance of every avenue, that we should not be at a loss for the way out on our return) was one that led us in a southerly direction for more than two miles. We then left it, and took another that led us east, and then north, for more than two miles further: and at last, in our windings, we were brought out by another avenue into the Chief city again, after traversing different avenues for more than five miles. We rested ourselves for a few minutes on some limestone slabs near the centre of this

Mammoth Cave of Kentucky.

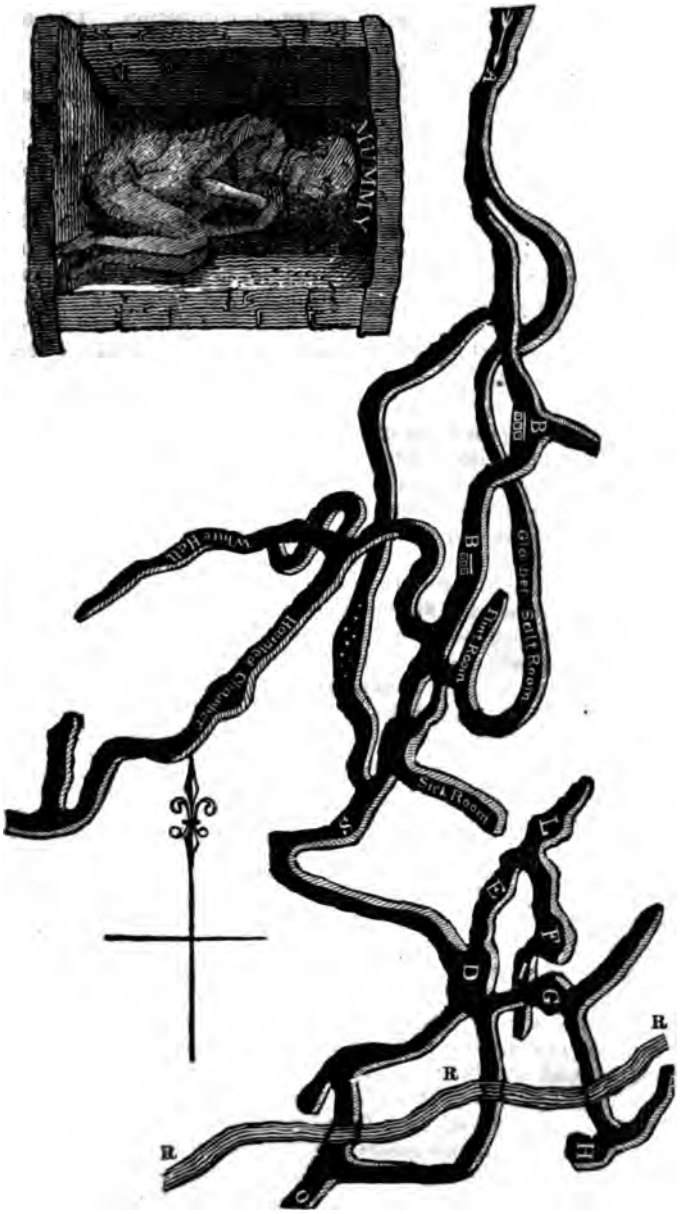
gloomy area; and after having refreshed us, and trimmed our lamps, we took our departure a second time through an avenue almost north, and parallel with the avenue leading from the Chief city to the mouth of the cave, which we continued for upward of two miles, when we entered the *Second city* (E). This is covered with an arch, nearly two hundred feet high in the centre, and very similar to the *First city*, except in the number of avenues leading from it—this having but two. We passed through it, over a very considerable rise in the centre, and descended through an avenue which bore to the east about three hundred rods, when we came upon a third area (L) about two hundred feet square and fifty in height, which had a pure and delightful stream of water issuing from the side of the wall about sixty feet high, and which fell upon some broken stones, and was afterward entirely lost to our view. After passing this beautiful sheet of water a few yards, we came to the end of this passage.

"We then returned about one hundred yards, and entered a small avenue (over a considerable mass of stone) to our left, which carried us south, through an uncommonly-black avenue, something more than a mile, when we ascended a very steep hill about sixty yards, which carried us within the walls of the *Fourth city* (F), which is not inferior to the second, having an arch that covers at least six acres. In this last avenue, the further end of which must be four miles from the Chief city, and ten from the mouth of the cave, are upward of twenty large piles of saltpetre earth on one side of the avenue, and broken limestone heaped up, evidently the work of human hands.

"I had expected, from the course of my needle, that this avenue would have carried us round to the Chief city, but was sadly disappointed when I found the end, a few hundred yards from the Fourth city, which caused us to retrace our steps; and not having been so particular in marking the entrances of the different avenues as I ought, we were very much bewildered, and once completely lost for fifteen or twenty minutes. At length we found our way, and, weary and faint, entered the Chief city at ten at night. We now entered the fifth and last avenue from the Chief city, which carried us southeast about nine hundred yards, when we arrived at the *Fifth city* (G), whose arch covers upward of four acres of level ground strewed with broken limestone. Fire-beds of uncommon size, with brands of cane lying around them, are interspersed throughout this city.

"We crossed over to the opposite side, and entered an avenue that carried us east about two hundred and fifty rods: finding nothing interesting in this passage, we turned back, and crossed a massy pile of stone in the mouth of a large avenue, which I noticed, but a few yards from this last-mentioned city, as we came out of it. After some difficulty in passing over this mass of limestone, we entered a large avenue, whose walls were the most perfect of any I saw, running almost due south for five hundred rods, very level and straight, with an elegant arch. When at the end of this avenue, and while I was sketching a plan of this cave, one of my guides, who had been sometime groping among the broken stone, called out, requesting me to follow him.

"I gathered up my papers and compass, and after giving my guide, who sat with me, orders to remain where he was until we returned, and, moreover, to keep his lamp in good order, I followed after the first, who had entered a vertical passage just large enough to admit his body. We continued stepping from one stone to another, until at last, after much difficulty, from the smallness of the passage, which is about ten feet in height, we entered on the side of a chamber at least one hundred and eighty feet in circumference, and whose arch is about one hundred and fifty feet high in the centre. After having marked arrows pointing downward upon the slab-stones around the



Plan of the Mammoth Cave of Kentucky; with Mummy, now in the American Museum, New York.

little passage through which we had ascended, we walked forward nearly to the centre of this area.

"It was past midnight when I entered this chamber of eternal darkness. With the guide, I took the only avenue leading from this chamber, and traversed it to the distance of a mile in a southern direction. The avenue, or passage, was as large as any that we had entered; and how far we might have travelled, had our lights held out, is uncertain.

"It is supposed that *Green river*, a stream navigable for boats, passes over three branches of this cave (R R R).

"It was nearly one o'clock when we descended 'the passage of the chimney,' as it is called, to the guide whom I had left seated on the rocks. He was quite alarmed at our long absence, and was heard by us a long time before we reached the passage to descend to him, hallooing with all his might, fearing we had lost our track in the ruins above. Very near the vertical passage, and not far from where I left my guide sitting, I found some very beautiful specimens of soda, which I brought out with me. We returned over piles of saltpetre-earth and fire-beds, out of one avenue into another, until at last, with great fatigue and a dim light, we entered the walls of the Chief city, where, for the last time, we trimmed our lamps, and entered the spacious avenue that carried us to the Second hoppers. I found, when in the last-mentioned large avenue or upper chamber, many curiosities, such as Glauber salts, Epsom salts, flint, yellow ochre, spar of different kinds, and some petrifactions, which I brought out, together with the *mummy*, which was found at the Second hoppers (B). We happily arrived at the mouth of the cave about three in the morning, nearly exhausted with nineteen hours' continued fatigue.

"There is a passage in the main avenue, about sixty rods from the entrance, like that of a trap-door: by sliding aside a large flat stone, you can descend sixteen or eighteen feet in a very narrow defile, where the passage comes upon a level, and winds about in such a manner as to pass under the main passage, without having any communication with it, and at last opens into the main cave by two large passages. It is called *Glauber-salt room*, from salts of that kind being found there; there is also the *Sick-room*, the *Bat-room*, and the *Flint-room*, all of which are large, and some of them quite long. The last I shall mention is a very winding avenue, which branches off at the Second hoppers, and runs west and southwest for more than two miles: this is called the *Haunted chamber*, from the echo of the sound made in it. The arch of this avenue is very beautiful, incrusted with limestone, spar, and in many places the columns of *spar* are truly elegant, extending from the ceiling to the floor. I discovered in this avenue a very high dome (T), in or near the centre of the arch, apparently fifty feet high, hung in rich drapery, festooned in the most romantic manner for six or eight feet from the hanging, and in colors brilliant.

"The columns of spar and the stalactites in this chamber are extremely romantic in their appearance, with the reflection of one or two lights. There is a chair formed by this spar, called *Wilkin's arm-chair*, which is very large, and stands in the centre of the avenue, and is encircled with many smaller ones. Columns of spar fluted, and studded with knobs of spar and stalactites, drapery of various colors superbly festooned, and hung in the most graceful manner, are shown with brilliancy from the reflection of lamps.

"A part of the Haunted chamber is directly over the Bat-room, which passes under the Haunted chamber, without having any connexion with it. My guide led me into a very narrow defile on the left side of this chamber, and about one hundred yards from Wilkin's arm-chair, over the side of a smooth

nestone rock, ten or twelve feet, which we passed with much precaution, r had we slipped from our hold, we had gone 'to that bourne whence no aveller returns,' if I may judge from a cataract of water, whose dismal ound we heard at a considerable distance in this pit, and nearly under us. However, we crossed in safety, clinging fast to the wall, and winding down nder the Haunted chamber, and through a very narrow passage, for thirty or orty yards, when our course was west, and the passage twenty or thirty feet n width, and from ten to eighteen high, for more than a mile. At the furher part of this avenue, we came upon a reservoir of water, apparently having neither inlet nor outlet (X).

"We returned by the beautiful pool of water, which is called the *Pool of Antorius*. On our way back to the narow defile, I had some difficulty in eeping my lights, for the bats were so numerous and continually in our aces, that it was next to impossible to get along in safety. We returned by Wilkin's arm-chair, and back to the Second hoppers. It was at this place hat I found the *mummy* (see the engraving), where it had been carried from nother part of the cave for preservation. It is a female, about six feet in eight, and so perfectly dried as to weigh but twenty pounds when I found t. The hair on the back part of the head is rather short, and of a sandy ue; the top of the head is bald, and the eyes sunk into the head; the nose, r that part which is cartilaginous, is dried down to the bones of the face; he lips are dried away, and discover a fine set of teeth, white as ivory. The ands and feet are perfect, even to the nails, and very delicate, like those of young person; but the teeth are worn as much as a person's at the age of fty. The entire cavern has palpably been the channel of a river; the furows worn by which are still visible on the sides and in the floor."

The stupendous cavern on the north bank of the Black river, opposite the illage of Watertown, New York, from its great extent, and the great numer of spacious rooms, halls, and chambers, into which it is divided, is difficult, if not impossible, to describe. The mouth of the cavern is in a small ollow, about five feet below the surrounding surface of the earth. The decent is by sixteen feet and a half into a room, in which is a table rock, twelve r fourteen feet square, two feet thick, and elevated about four feet from the ottom of the cavern, the roof overhead covered with stalactites, some of hich reach to the table rock. On the left is an arched way of one hundred nd fifty feet, and on the opposite side is another arched way, which leads to large room. Another arch leads into a hall ten feet wide and one hundred et long, from five to eight high, supported with pillars and arches, and the des bordered with curtains, plaited in variegated forms, as white as snow. ear the middle of this hall is an arched way, leading to a large room, which, ke the hall, is bordered with curtains, and hung over with stalactites. The escent is by ten feet, into a chamber about twenty feet square and two feet igh, hung over with stalactites. Descending from this chamber, and passing rough another arch into a hall, by the side is a basin of water, rising about ur inches from the floor. The number and spaciousness of the rooms, curined, and plaited with large plaits, extending along the walls from two to ree feet from the roof, of the most perfect whiteness, resembling the most eautiful tapestry, with which the rooms are embroidered—the large drops of ater, which are constantly suspended on the points of innumerable stalactis which hang from the roofs above—the columns of spar resting on pedesls, which, in some places, appear to be formed to support the arches above -the reflection of the lights—and the great extent and variety of the scenery f this amazing cavern—form, altogether, a sublime spectacle.

In the limestone country of Virginia, there are several caverns, among

which the most celebrated is MADISON'S CAVE, on the north side of the Blue ridge. Its entrance is about two thirds high, in a moderately-elevated hill, into which it extends about three hundred feet, branching out into subordinate caverns, sometimes ascending a little, but more generally descending, and at length terminates at different places, in two basins of water, of unknown dimensions, that are never turbid. The vault of this cave is of solid limestone, from twenty to forty or fifty feet high, through which water perpetually percolates; and, trickling down its sides, has incrusted them with elegant drapery; or, dripping from the top, generates conical stalactites both above and below.

Caverns, especially those which are situated in limestone, commonly present the formations called stalactites, from a Greek word signifying distillation or dropping. The manner of their production admits of a very plain and simple explanation. They proceed from water trickling through the roofs containing carbonate of lime, held in solution by carbonic acid. Upon exposure to the air the carbonic acid is gradually disengaged, and a pellicle of lime is deposited. The process proceeds, drop after drop, and, eventually, descending points hanging from the roof are formed, resembling icicles, which are composed of concentric rings of transparent pellicles of lime, presenting a very peculiar appearance, and, from their connexion with each other, producing a variety of singular shapes. These descending points are the stalactites, properly so called, from which the stalagmites are to be distinguished, which cover the floors of caverns with conical inequalities. These are produced by the evaporation of the larger drops which have fallen to the bottom, and are stalactites rising upward from the ground. Frequently, in the course of ages, the ascending and descending points have been so increased as to meet together, forming natural columns, a series of which bears a striking resemblance to the pillars and arches of Gothic architecture.

The amount of this deposition which we find in caverns capable of producing it, is, in fact, enormous, and gives us an impressive idea of their extraordinary antiquity. The grotto of Antiparos—one of the islands of the Grecian archipelago—is particularly celebrated on account of the size and diversity of form of these deposites. It extends nearly a thousand feet beneath the surface, in primitive limestone, and is accessible by a narrow entrance which is often very steeply inclined, but divided by level landing-places. After a series of descents, the traveller arrives at the Great hall, as it is called, the sides and roof of which are covered with immense incrustations of calcareous matter. The purity of the surrounding stone, and the thickness of the roof in which the unfiltered water can deposite all impure admixtures, give to its stalactites a beautiful whiteness. Tall pillars stand in many places free, near each other, and single groups of stalagmites form figures so strongly resembling plants, that Tournefort endeavored to prove from them a vegetable nature in stone. The remark of that intelligent traveller is an amusing example of over-confidence: "Once again I repeat it, it is impossible this should be done by the droppings of water, as is pretended by those who go about to explain the formation of congelations in grottoes. It is much more probable that these other congelations we speak of, and which hang downward or rise out different ways, were produced by our principle, namely, vegetation." The sight of the whole is described by those who have visited this cavern, as highly imposing. In the middle of the Great hall there is a remarkably large and fine stalagmite, more than twenty feet in diameter, and twenty-four feet high, termed the Altar, from the circumstance of the Marquis de Nointel, the ambassador from Louis XIV. to the sultan, having caused high mass to be celebrated here in the year 1673. The ceremony was at-

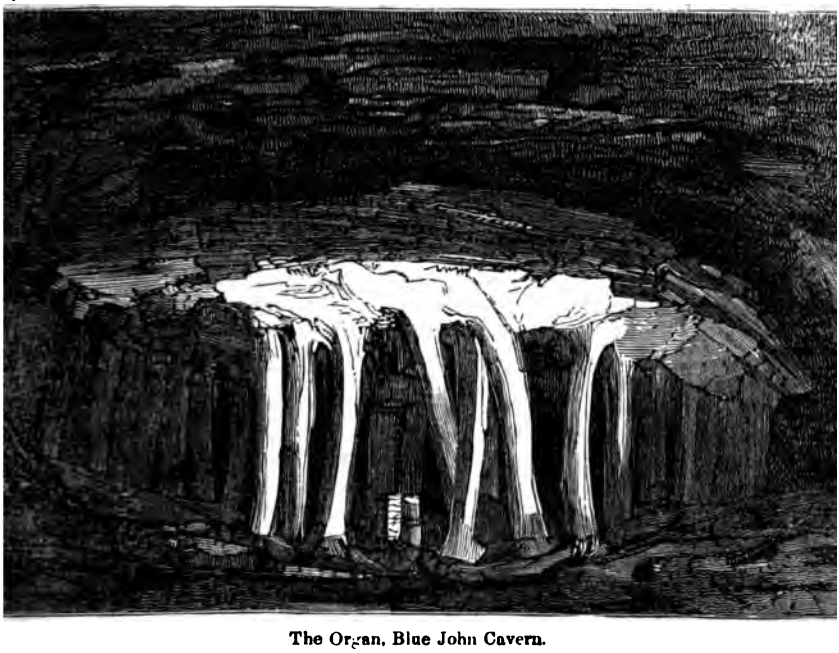
Entrance to Grotto of Adelsberg.

tended by five hundred persons; the place was illuminated by a hundred large wax torches; and four hundred lamps burned in the grotto, day and night, for the three days of the Christmas festival. This cavern was known to the ancient Greeks, but seems to have been completely lost sight of till the seventeenth century. Some of the caves of France and Germany have a high reputation for the number and beauty of their deposites; but the finest examples are found in the cave of Adelsberg. The stalagmites here have formed two bridges over the subterranean river, which are situated almost a mile apart, the inner one of which hangs suspended from eighty to a hundred fathoms over the abyss. An American visiter thus graphically describes some of the principal objects:—

"We advanced with ease through the windings of the cavern, which at times was so low as to oblige us to stoop, and at times so high that the roof was lost in the gloom. But everywhere the most wonderful varieties of stalactites and crystals met our admiring view. At one time we saw the guides lighting up some distant gallery far above our heads, which had all the appearance of verandahs adorned with Gothic tracery; at another, we came into what seemed the long-drawn isles of a Gothic cathedral, brilliantly illuminated. The whimsical variety of forms surpasses all the powers of description. Here was a butcher's shop, which seemed to be hung with joints of meat; and there, a throne with a magnificent canopy. There was a appearance of a statue with a bearded head, so perfect that you could h thought it the work of a sculptor; and further on, toward the end of our w the figure of a warrior with a helmet and coat-of-mail, and his arms cro of the illusion of which, with all my efforts, I could not possibly divest mind. Two stalactites, descending close to each other, are called, German inscription over them, with sentimentality truly German, '*the of two hearts.*' The resemblance is certainly very striking. After pa the 'Hearts,' we came to the 'Ball-room.' It is customary for the inh ants of Adelsberg and the surrounding country, to come on Whit-Mon to this grotto, which is brilliantly illuminated; and the part called the B room is actually employed for that purpose by the peasantry. A gall very appositely formed by nature, serves the musicians for an orchestra; wooden chandeliers are suspended from the vaulted roof. It is impossi for me to describe minutely all the wonderful varieties; the 'Fountai seeming, as they fall, to be frozen into stone; the 'Graves,' with weep willows waving over them; the 'Picture,' the 'Cannon,' the 'Pulpit,' 'Sausage-maker's shop,' and the 'Prisons.' I must not omit mentioning part, which, though less grand than many others, is extremely curious. Th *stalactites* have here formed themselves like folds of linen, and are so thin to be transparent. Some are like shirt-ruffles, having a hem, and looking if they were embroidered; and there is one, called the 'Curtain,' which hangs exactly in natural folds like a white and pendent sheet. Everywhere you hear the dripping as of a continual shower, showing that the mighty work is still going on, though the several stages of its progress are imperceptible. Our attention was so excited, that we had walked two hours without feeling the least fatigue, or being sensible of the passage of time. We had gone beyond the point where most travellers had stopped, and had been rewarded for it by seeing stalactites of undiminished whiteness, and crystals glittering, as the light shone upon them, like unnumbered diamonds."

Stalactical depositions vary in color according to the nature of the surrounding rocks, and Humboldt remarks in general that the formations occur more beautifully and completely in proportion as the caves are narrow and enclosed, since the deposition of crystals is less disturbed by the circulation

the surrounding air. On this account those of the wide open cavern of ripe, which he explored, were far inferior to the stalactites of Adelsberg. Great Britain the spot most remarkable for these formations is the Blue hn mine, another of the celebrated places of the peak, near its great cav- ı. This is a natural cavity, worked as a mine for the sake of obtaining ; excellent fluor spar which gives its name to the site, and which is here ınd in small detached pieces in the limestone rock Rude steps, leading wnward about sixty yards, conduct to a series of caverns and passages en ısted with depositions of lime which have assumed a variety of interesting ·ms. In our illustrated instance, stalactites, of a delicate pearly yellow lor, of fine texture, and fantastically varied one from the other, have grown wnward until they rest upon some shelf of a lower stratum, probably of rthy matter. Arriving at such a plane, the waters in future spread more dely around, forming a deposite, and connecting the former stems with an 'erior tablet of similar composition. The earthy or mineral stratum having en by some chance removed, the fairy columns attached to their kindred or now remain suspended in middle space. These are graphically termed he Organ." Here, as at Antiparos, the principal subterranean apartment



The Organ, Blue John Cavern.

; termed the "Hall," a wide and lofty cavity, such as imagination conceives vould be a fitting home for the romantic outlaws of Salvator Rosa, or the purious banditti of the English Mortimer. In this spot, not a long time ago, ı popular nobleman, who prosecuted adventurous researches in the most langerous recesses of the mine, feasted a multitude of his friends, and made he wet rock resound to the toasts and sentiments imported from a more fash- ionable atmosphere. In a certain direction from this grand focus the visiter is led to a narrower and more irregular space, presenting a towering cupola the grandeur of whose shivered sides can only be exhibited by drawing up- ward, with cord and pulley, a round of lighted candles supplied by the

conductor: these illuminate successively the varied and peculiar stages of the internal surface. The perpetual waters which trickle down have left a residuum of lime, which has been moulded, by accident, and by industrious and gentle operation, into a thousand free tresses and waving bands. The whole is fashioned by nature with less of the abrupt form which characterizes the congelation of fountain streams by cold, and presents a grotesque enamel of exquisite polish and gracefulness, giving to the artificial plain or colored lights, uplifted within the conical abyss, beautiful reflections from its unrivalled crystallized surfaces. Frequently, while attention is riveted to the precinct of gloom and awful solitude, a chant of voices is heard from the summit of the dome, accessible by hidden performers from other avenues of the mine. The fleeting and distant expression of sound, with the mournful intervals of the strain, seems like a song of captive spirits, obedient to the rigid discipline of some invincible gnome.

The temperature of caverns exhibits great diversities, dependent upon their extent and form, and that of the same cavern will greatly vary at different seasons. In those which are dry and deep, covered with a thick stony roof, and withdrawn from the influence of the alteration of the external air, by having only a limited opening, the temperature can vary but little, and will continue through the whole year at nearly the same degree of warmth which is peculiar to their geographical situation. Before the warmer air of summer has so penetrated the roof that the temperature of the cavern can be somewhat raised, the cooler air of the autumn and of the winter begins to penetrate; but before this lower temperature can establish itself, it is again overtaken by the warmth of the following spring and summer. The consequence of all this is a temperature subject to little alteration, but lower than the mean temperature of the surrounding atmosphere. The ancient Romans hence, according to Seneca, were accustomed to erect their country seats in the vicinity of those natural cavities which abound about the capital, for the purpose of enjoying their refreshing chilliness in the summer season. It was in one of these volcanic caverns that Tiberius was nearly destroyed while at supper; for, during the banquet, the roof suddenly gave way, and buried several of his attendants beneath its ruins, when Sejanus threw himself upon the emperor to preserve him from the falling stones.

Many caverns, however, vary greatly in their temperature, and exhibit the apparently strange anomaly of being cold when the external air is warm, and warm when it is cold, in some instances carrying this contrast to the extreme, so as to be coated with ice amid the heat of summer, and affording a comfortable warmth amid the cold of winter. In the neighborhood of Czilicze, a village of Hungary, there is a cave in the transition limestone of the Carpathians which displays this phenomenon. The country in the vicinity abounds with woods, and the air is sharp and cold. The entrance of the cavern, which fronts the north, is eighteen fathoms high, and eight broad; consequently, wide enough to receive a large supply of external air, which here generally blows with great violence; but the subterranean passages, which consist entirely of solid rock, winding round, stretch away further to the north than has been yet discovered. In the midst of winter the air in this cavern is warm; but in summer, when the heat of the sun without is scarcely supportable, the cold within is not only very piercing, but so intense that the roof is covered with icicles of great size, which, spreading into ramifications, form very grotesque figures. When the snow melts, in spring, the inside of the cave, where its surface roof is exposed to the sun, emits a pellucid water, which immediately congeals as it drops, and thus forms the above icicles; and the very water that drops from them on the sandy ground freezes

in an instant. It is even observed that the greater the heat is without, the more intense is the cold within, so that in the dog-days all parts of this cavern are covered with ice, which the inhabitants use for cooling their liquors. The quantity of ice is so great that a narrator estimates that it would require six hundred wagons to remove it in a week. In autumn, when the nights grow cold and the heat of the day begins to abate, the ice in the cavern begins to dissolve, so that by winter no more ice is seen. The cavern then becomes perfectly dry, and has a mild warmth. At that season it is the haunt of swarms of flies, gnats, bats, owls, and even of hares and foxes, that resort hither, as to their winter retreat, and remain till the return of spring. An instance almost as singular occurs at Besançon, in a grotto which extends three hundred and sixty-four feet into the rock, the mouth of which, like that of Czilicze, is toward the north, and covered with vegetation. During the whole summer this cavern contains masses of ice, which melt away in October and November.

This apparently anomalous phenomenon is susceptible of a very satisfactory explanation by the relation which subsists between the moisture in these caverns and the external air. When it is hot and dry outside, as in summer, evaporation takes place, and by this means a considerable degree of warmth is withdrawn from the enclosed air, the vapors making their escape through the openings, and through fissures in the roofs. The greater the exterior temperature the more vigorously the evaporation is carried on, producing a degree of cold in the interior which may sink beneath the freezing point, just as in the greatest heat we can most readily freeze water if we surround it with ether. It is upon this principle that travellers, in some regions, are accustomed to cool their drinks, which they bury in the earth, and light a quickly-blazing fire over it, when the desired coolness is produced. On the contrary, the more the warmth and dryness of the external air are diminished, as in winter, the less will be its capability to promote evaporation in the cavern, the warmth in the air will no longer be absorbed, and the ice which has been produced must melt. The cooling in these caverns, however, so as to sink below the freezing point, can only occur where there is a certain relation, which but rarely subsists, between the openings and the evaporating surface of the interior. If the opening is too large, too much warm air is introduced, and the temperature of the interior is thereby much more increased than it can be diminished by evaporation. If it is too small, the vapors can not withdraw themselves fast enough, and the evaporation is lessened, because the surrounding air is saturated with moisture. The ice-caverns, therefore, are comparatively rare; but, in addition to those named, there is a cave at Vasoul, in France, where a stream flowing through it is frozen over in summer, and clear of ice in winter. Mr. Murchison, in the course of some recent geological surveys in Russia, met with a freezing cavern near the imperial salt-works at Iletski, to the south of the Ural mountains, situated at the southern base of a hillock of gypsum, one of a series of natural hollows used by the peasantry for cellars or stores. The cave in question is, however, the only one in the district which possesses the singular property of being partially filled with ice in summer, and of being destitute of it in winter. "Standing on the heated ground and under a broiling sun, I shall never forget," he remarks, "my astonishment when the woman to whom the cavern belonged unlocked a frail door, and a volume of air so piercingly keen struck the legs and feet, that we were glad to rush into a cold bath in front of us to equalize the effect." Three or four feet within the door, and on a level with the village street, beer and quash were half frozen. A little further the narrow chasm opened into a vault fifteen feet high, ten

paces long, and from seven to eight feet wide, which seemed to send off irregular fissures into the body of the hillock. The whole of the roof and sides were hung with solid undripping icicles, and the floor was covered with hard snow, ice, or frozen earth. During the winter all these phenomena disappear; and when the external air is very cold, and all the country is frozen up, the temperature of the cave is such that the Russians state they could sleep in it without their sheep-skins.

There is another circumstance of high interest disclosed by the interior of many caverns, the occurrence of extinct animals of the ancient earth; on which account these receptacles have obtained the name of zoolithes or bone caverns. This phenomenon prevails in almost every country of Europe, and also of America, and has obtained of late years, particularly by the investigations of Dr. Buckland, who has made it the subject of his peculiar study, a high degree of importance, on account of the light which it throws upon the ancient condition of the earth, and the changes which the surface has undergone. His researches into the condition of a cave discovered in 1821 at Kirkdale, in Yorkshire, are highly valuable, and deserve a notice here. Its mouth had long been choked up with rubbish, and overgrown with grass and bushes, but was accidentally found by some workmen. The cave is situated on the older portion of the oolite formation (in the coral rag and Oxford clay) on the declivity of a valley. It extends as an irregular narrow passage two hundred and fifty feet into the hill. There are a few expansions, but scarcely high enough to allow a man to stand upright. The sides and floor were found covered with a deposite of stalagmite, beneath which there was a bed of from two to three feet of fine sandy and micaceous loam, the lower portion of which in particular contained an innumerable quantity of bones, with which the floor was completely strewn. The greater part of them were very well preserved, and still retained a great portion of their natural gluten, in consequence of the peculiar nature of their investiture. The animals to which they belonged were the hyæna, bear, tiger, and lion, elephant, rhinoceros, hippopotamus, horse, ox, deer of three species, water-rat, and mouse, belonging wholly to extinct species, and the same with those with which we are acquainted in the steppes of Asia. The most plentiful of all were the remains of the hyæna, and from the amount which he saw, Buckland estimated the number of the individuals interred here to be between two and three hundred. The animal must have been one half larger than the living species, in its structure resembling the hyæna of the Cape. The bears which were less abundant, belonged to the large cavern species, which, according to Cuvier, was about the size of a large white horse, and about eighteen feet in length. The elephant was the Siberian mammoth. Of the stags, the largest was of the size of the moose deer. Of the ox, two species were distinguished, and its bones were most frequent next to those of the hyæna. All these bones lay irregularly strewed one with another, but those of the largest animals were in the most remote and narrowest corners, into which they never could have penetrated while living. The teeth, and the hard marrowless bones of the extremities, as well as those of the fore and hind feet, were uninjured: these were so numerous that they must have belonged to a much greater number of individuals than could be estimated as belonging to the other bones. Many of the bones bore marks which exactly corresponded with the form of the incisor teeth of the hyæna, and the broken horns of the stag were evidently marked by gnawing. These facts warranted the conclusion, that the hyænas must have lived for a long time in this cave, and have dragged the bones of the larger animals, particularly the oxen, into this den, as their prey. The supposition was confirmed in the

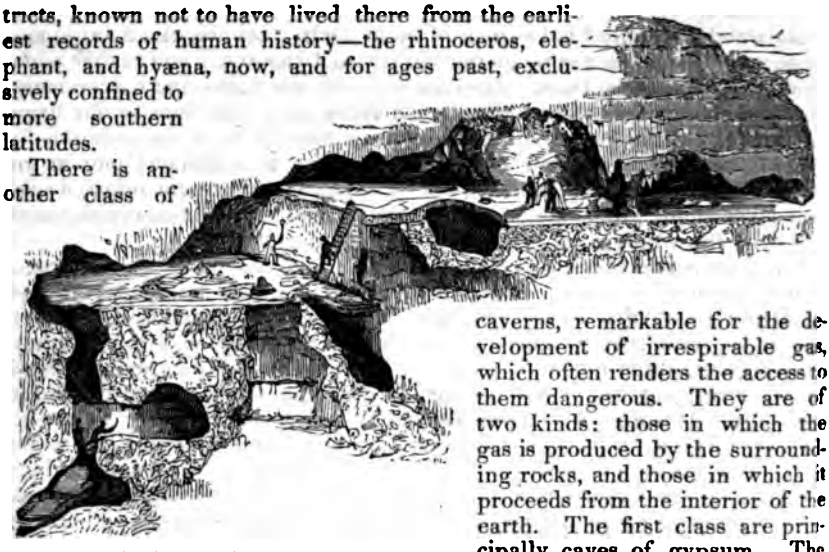
most striking manner by a variety of other facts. Dr. Buckland found that bones which he caused to be gnawed by living hyænas had exactly the same appearance as those found in the cavern, and the teeth and harder bones were thrown aside by them. He even found in great abundance excrements of the hyæna, which offered the closest resemblance to those of the living animal. From the facts described, it appears that the Kirkdale cave was for a long series of years a den inhabited by hyænas, who dragged into its recesses the other animal bodies whose remains are there commingled with their own—some great catastrophe causing an inundation in this region which destroyed the whole race.

In Germany the zoolithic caverns are much more important and numerous than in England. There is a remarkable example on the northeast border of the Hartz mountains, called Bauman's Höhle, after an unfortunate miner, who, in the year 1670, ventured into it alone in search of ore; and after having wandered three days and nights in its solitude and darkness, at length found his way out, but in such a state of exhaustion that he died almost immediately. It is a suite of natural chambers in a bed of transition limestone, the floor of which is composed of a thick crust of stalagmite, beneath which lies an accumulation of several feet of mud mixed with bones and pebbles. But the caves of Franconia are by far the richest and most beautiful of this class. They lie on the northeast extremity of the chain of the Jura, between Nuremburg and Baireuth, in the valley of the Wiesent, a tributary stream of the valley of the Maine. The most important is the cave of Gailenreuth, situated in a perpendicular rock, its mouth being upward of three hundred feet above the bed of the river, consisting of an aperture seven feet high and twelve broad. An open fissure in the rock extends from the cave to the table-land above, as shown in the illustration. The floor consists of stalagmite lying over a bed of slime which contains the animal remains. The cave has two chief chambers, the roof of which is abundantly hung with stalactites. From the first to the second chamber, the visiter descends by a ladder, as represented in the section, which exhibits the breccia of bones, pebbles, and loam, and the artificial extension of the cavern by the removal of it. Almost all the bones belong to the bear of the caverns, and are admirably preserved. Those of a species of cat, resembling the American jaguar, have also been discovered, and those of the hyæna; but the latter are of rare occurrence. In conformity with the habits of the bear, the remains of prey, dragged in, are almost entirely wanting. There are two neighboring caverns of the same class; those of Zahnloch (teethhole) and Kühloch. The latter animal is supposed to contain animal matter equal to at least 2,500 individuals of the cavern bear; and allowing an annual mortality of two and a half, it follows that here we have the history of a thousand years; for probably these animals retired to the solitude of the spot upon the approach of death, as is the wellknown custom of many creatures. The bone caverns in our own country and the continent, decisively prove that, previous to a great inundation in bygone time, animals inhabited these dis-

Gailenreuth.

tricts, known not to have lived there from the earliest records of human history—the rhinoceros, elephant, and hyæna, now, and for ages past, exclusively confined to more southern latitudes.

There is another class of caverns, remarkable for the development of irrespirable gas, which often renders the access to them dangerous. They are of two kinds: those in which the gas is produced by the surrounding rocks, and those in which it proceeds from the interior of the earth. The first class are principally caves of gypsum. The gypsum is not, however, the cause of the phenomenon, the component parts of which are not susceptible of any decomposition from the air. There is commonly fetid limestone intimately mixed up with it, which forms connected wavy stripes, and even single beds of considerable thickness. This earthy limestone, which is penetrated with bitumen, and often very clayey in its composition, has the property of giving out all its carburetted hydrogen in the air; and in every case where caves exist in it, its presence, on account of its connexion with gas, is offensive and much dreaded. In the limestone caves of the sandstone formations, on the contrary, there commonly prevails a very pure air, possibly because they are filled with mouldering animal remains. The development of irrespirable gases from the interior of the earth, which, penetrating through fissures, collect in caves, is a constant result of volcanic activity. The chymical processes continually going on in volcanic regions, must produce the liberation of great quantities of gas, which are connected with the world above by these chimneys of the perpetual forge. Caverns of this nature occur therefore only in the neighborhood of volcanoes, or at points where volcanic processes may be supposed to be going on beneath. The gases so developed are almost entirely the carbonic and sulphuric acids. Among the most important of the grottoes which give out carbonic acid, there is the grotto del Cane at Naples, in the neighborhood of the Lago d'Agnano, near Pozzuoli. It was known to the ancients, and is mentioned by Pliny, who refers to it as one of a class of excavations, called, in his time, "Charon's ditches." Its size is very unimportant; ten feet deep, four feet broad, and nine feet high. The carbonic acid collects itself on the soil in a bed of about six inches deep; and, on account of its specific gravity, does not mingle with the atmospheric air. Its actual height may be clearly ascertained by lighting some candles, which, when they reach its surface, are extinguished at once. Small animals falling in are speedily suffocated; and it takes its name from the dogs which are placed in it by way of experiment. The cave and its neighborhood appear to have undergone some considerable changes; for, from Pliny's reference to the mephitic gas, it would seem to have been fatal to human life, which is



Section of Gailenreuth Cave.

sible now, owing to the small height of the stratum, unless an indi-
threw himself upon the surface of the floor. According to some an-
ccounts, bubbles were constant upon the lake Agnano close by, occa-
by the escape of gas, of which there is no appearance now; so that
antity of deadly air exhaled has been much reduced, if dependence
placed upon these authorities. A similar instance, on a much larger
s seen in the crater of the extinct volcano of St. Leger, or of Neyruc
south of France, on the banks of the Ardèche, amid the great number
anic remains of that region. This crater exhibits a cultivated, and in
habited district, which is surrounded like an amphitheatre by the an-
alls of volcanic debris. Its soil is one vast sieve for the ascent of car-
cid. Perforations have been made in it to facilitate the emission of
, and guide it from the fields, to which its contact is very injurious.
ight of the bed of gas, over the ground of these holes, has been found
in the most favorable circumstances, about one foot and a half.
s of weather have the most important influence on it; and in violent
e whole mass of gas is absorbed.

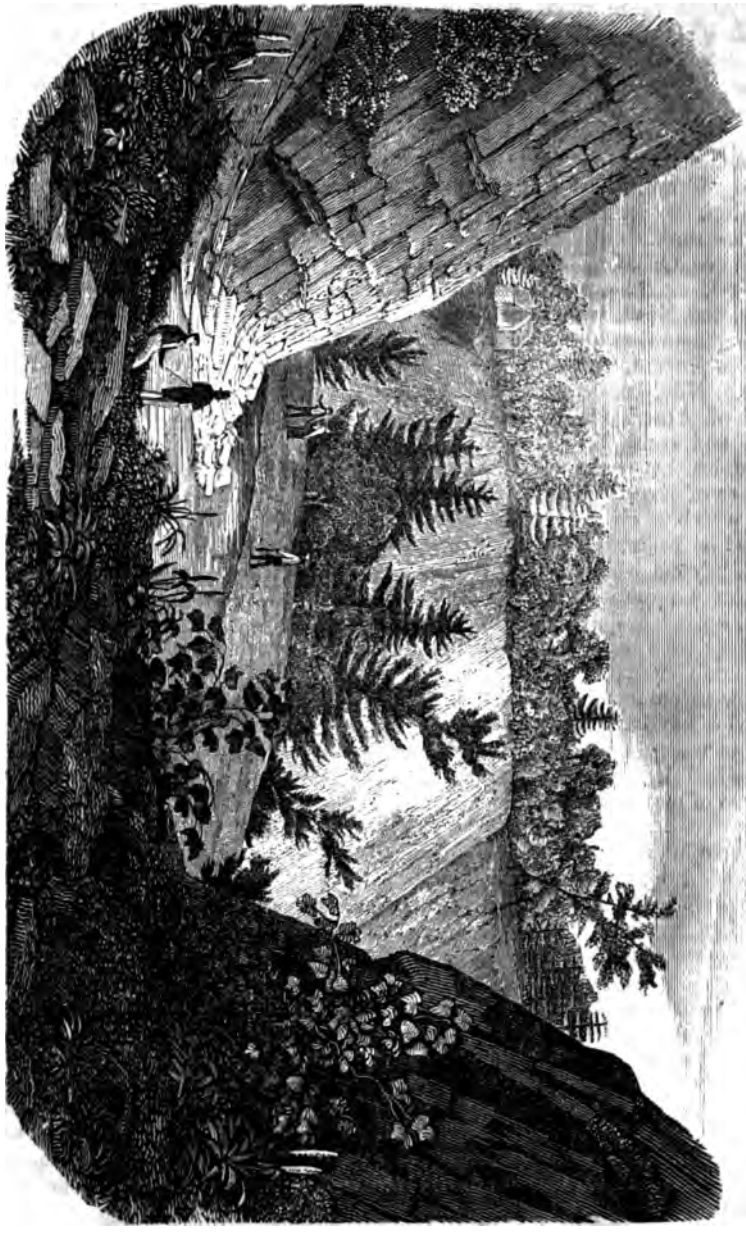
Sybil's Cave, Hoboken, New Jersey.

SUBJECT X.

RIVERS.

IVERS constitute an important part of the aqueous portion of the globe; with the great lines of water, with streams and rivulets, they form a numerous family, of which lakes, springs, or the meltings of ice and snow, upon the summits of high mountain-chains, are the parents. The Shannon has its source in a lake; the Rhone in a glacier; and the Abyssinian branch of the Nile in a confluence of fountains. The country where some of the mightiest rivers of the globe have their rise, has not yet been sufficiently explored to render their true source ascertainable. The origin of others is doubtful, owing to a number of rills presenting equal claims to be considered as the river-head; but many are clearly referable to a single spring, the current of which is speedily swelled by tributary waters, ultimately flowing in broad and deep channels to the sea. Inglis, who wandered on foot through many lands, had a fancy, which he generally indulged, to visit the sources of rivers, when the chances of his journeys threw him in their vicinity. Such a pilgrimage will often repay the traveller by the scenes of picturesque and secluded beauty into which it leads him; and even when the primal fount is insignificant in itself, and the surrounding landscape exhibits the tamest features, there is a reward in the associations that are instantly awakened up—the thought of an humble and modest commencement issuing in a long and victorious career—of the tiny rill, proceeding, by gradual advances, to become an ample stream, fertilizing by its exudations, and rolling on to meet the tides of the ocean, bearing the merchandise of cities upon its bosom. The Duddon, one of the most picturesque of the English rivers, oozes up through a bed of moss near the top of Wrynose Fell, a desolate solitude, yet remarkable for its huge masses of protruding crag, and the varied and vivid colors of the mosses watered by the stream. Petrarch's letters and verses have given celebrity to the source of the Sorques—the spring of Vaucluse which bursts in an imposing manner out of a cavern, and forms at once a copious torrent. The Scamander is one of the most remarkable rivers for the grandeur of its source—a yawning chasm in Mount Gargarus, shaded by enormous plane-trees, and surrounded with high cliffs, from which the river impetuously dashes in all the greatness of the divine origin assigned to it by ancient fable.

Upon examining the map of a country, we see many of its rivers travelling in opposite directions, and emptying their waters into different seas, although their sources frequently lie in the immediate neighborhood of each other. The springs of the Missouri which proceed southeast to the gulf of Mexico, and those of the Columbia which flow northwest to the Pacific ocean, are only a mile apart, while those of some of the tributaries of the Amazon flowing north, and of the La Plata flowing south, are closely contiguous. There is a part of Volhynia, of no considerable extent, which sends off its waters, north and south, to the Black and Baltic seas: the district referred to is a plateau

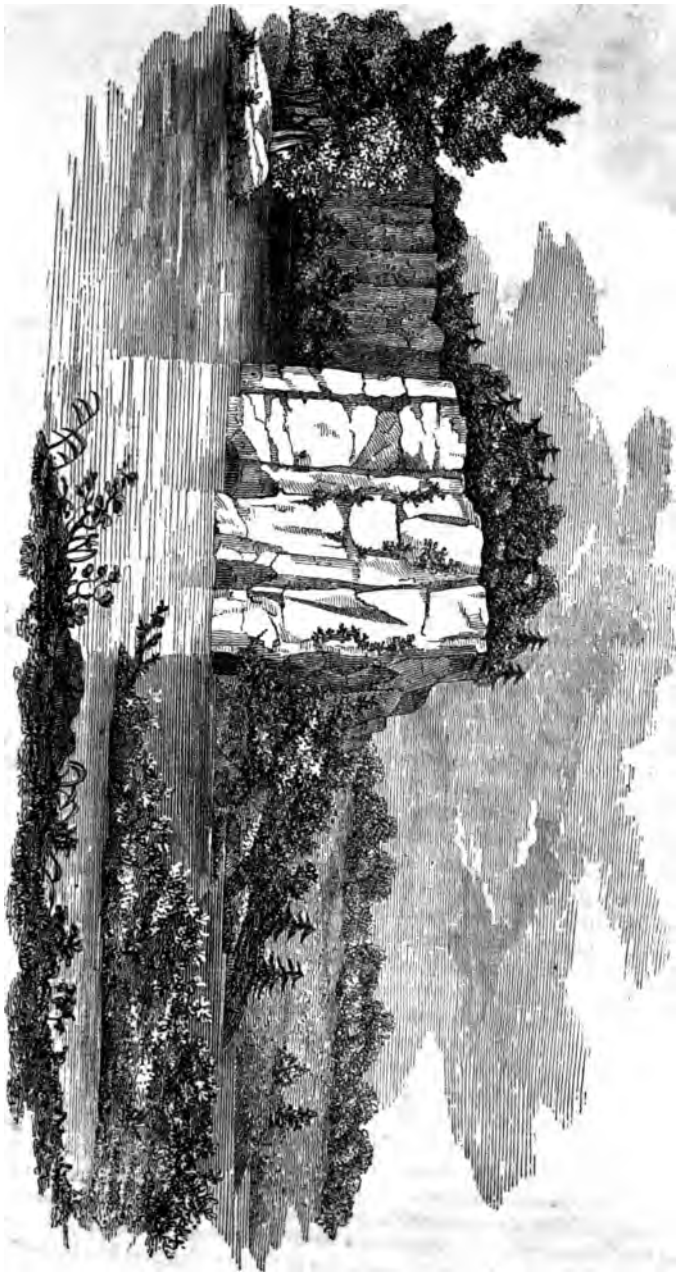


Source of the Passaic River.

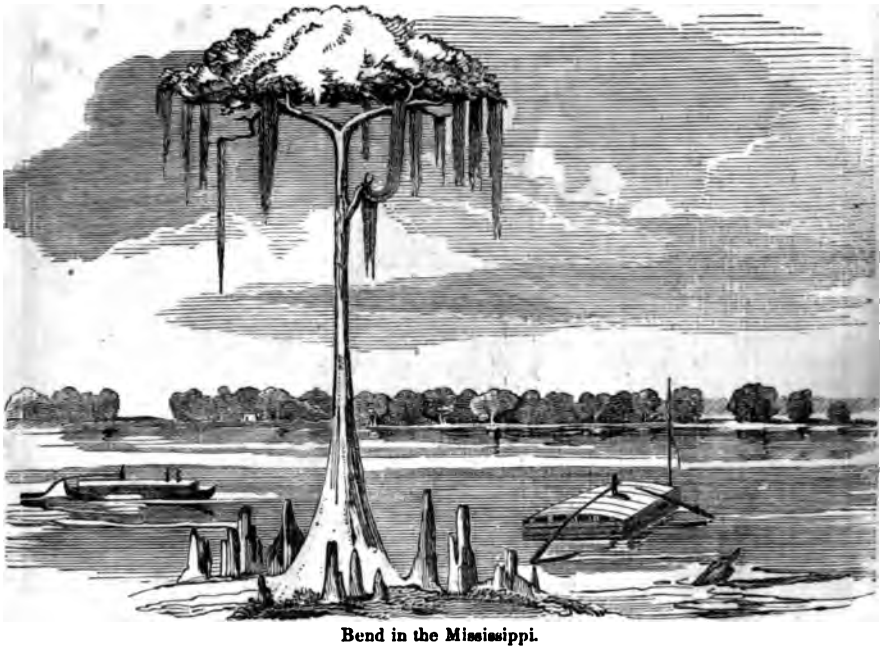
about a thousand feet above the level of the sea. The springs of the Missouri and the Columbia are in the Rocky mountains; the source of the Passaic is shown in the cut; and it is generally the case that those parts of a country from which large rivers flow in contrary directions, are the most elevated sites in their respective districts, consisting either of mountain-chains, plateaus, or high table-lands. There is one remarkable exception to this in European Russia, where the Volga rises in a plain only a few hundred feet above the level of the sea, and no hills separate its waters from those which run into the Baltic. The great majority of the first-class rivers commence from chains of mountains, because springs are there most abundant, perpetually fed by the melting of the snows and glaciers. They have almost invariably an eastern direction, the westward-bound streams being few in number, and of very subordinate rank. Of rivers flowing east, we have grand examples in the St. Lawrence, Orinoco, Amazon, Danube, Ganges, Amour, Yang-tse-Kiang, and Hoang-Ho. The chief western streams are the Columbia, Tagus, Garonne, Loire, and Neva, which are of far inferior rank to the former. The rivers running south, as the Mississippi, La Plata, Hudson, Volga, and Indus, are more important, as well as those which proceed to the north, as the Rhine, Vistula, Nile, Irtish, Lena, and Yenisei. The easterly direction of the great rivers of America is obviously due to the position of the Andes, which run north and south, on the western side of the continent, while the chain of mountains that traverses Europe and Asia, from west to east, cause the great number of rivers which flow north and south. The whole extent of country from which a river receives its supply of water, by brooks and rivulets, is termed its basin, because it is a region generally bounded by a rim of high lands, beyond which the waters are drained off into another channel. The basin of a superior river includes those of all its tributary streams. Sometimes, however, the basins of a river are not divided by any elevations, but pass into each other, a connexion subsisting between their waters, as the Amazon and Orinoco, the Cassiaquaire, a branch of the latter, joining the Rio Negro, an affluent of the former.

Rivers have a thousand points of similarity and of discordance. Some exhibit an unbroken sheet of water through their whole course, while others are diversified by numerous islands. This peculiarly characterizes the vast streams of our continent, and contributes greatly to their scenical effect. The St. Lawrence, soon after issuing from the lake Ontario, presents the most remarkable instance to be found of islands occurring in a river-channel. It is here called the "Lake of the Thousand Islands." The vast number implied in this name was considered a vague exaggeration, till the commissioners employed in fixing the boundary between the United States and Canada actually counted them, and found that they amounted to sixteen hundred and ninety-two. They are of every imaginable size, shape, and appearance; some barely visible, others covering fifteen acres; but in general their broken outline presents the most picturesque combinations of wood and rock. The navigator in steering through them sees an ever-changing scene, which reminds an elegant writer of the "Happy Islands" in the "Vision of Mirza." Sometimes he is enclosed in a narrow channel; then he discovers before him twelve openings, like so many noble rivers; and soon after a spacious lake seems to surround him on every side. River-islands are due to original surface inequalities, but many are formed by the arrest and gradual accretion of the alluvial matter brought down by the waters.

Rivers vary much in their length, the force of their current, and the mass and complexion of their waters; but their peculiar character obviously depends on that of the country in which they are situated. As it is the property of

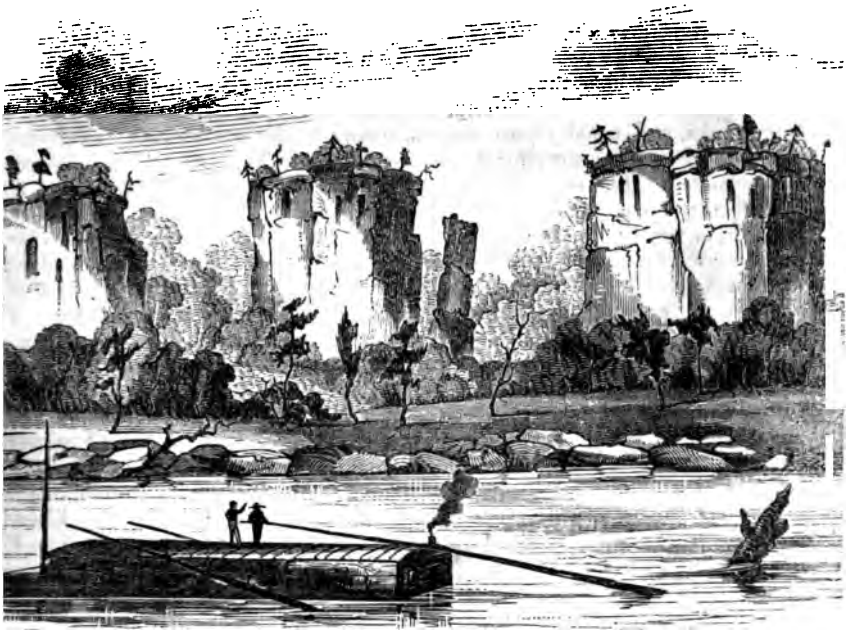


View on Illinois River.



Bend in the Mississippi.

water to follow a descent, and the greatest descent that occurs in its way, the course of a river points out generally the direction in which the land declines, and the degree of the declination determines in part the velocity of its current, for the rapidity of a stream is influenced both by its volume of water and the declivity of its channel. Hence one river often pours its tide into another without causing any perceptible enlargement of its bed, the additional waters being disposed of by the creation of a more rapid current, for large masses of water travel with a swift and powerful impetus over nearly a level surface, upon which smaller rivers would have only a languid flow. In general, the fall of the great streams is much less than what would be supposed from a glance at their currents. The rapid Rhine has only a descent of four feet in a mile between Schaffhausen and Strasburg, and of two feet between the latter place and Schenckenschautz; and the mighty Amazon, whose collision with the tide of the Atlantic is of the most tremendous description, falls but four yards in the last seven hundred miles of its course, or one fourth of an inch in one and a fourth miles. In one part of its channel the Seine descends one foot in a mile; the Loire between Pouilly and Briare one foot in 7,500, and between Briare and Orleans one foot in 13,596; the Ganges, only nine inches; and, for four hundred miles from its termination, the Paraguay has a descent of but one thirty-third of an inch in the whole distance. The fall of rivers is very unequally distributed; such, for instance, as the difference of the Rhine below Cologne and above Strasburg. The greatest fall is commonly experienced at their commencement, though there are some striking exceptions to this. When water has once received an impulse by following a descent, the simple pressure of the particles upon each other is sufficient to keep it in motion long after its bed has lost all inclination. The chief effect of the absence of a declivity is a slower movement of the stream, and a more winding course, owing to the aqueous particles being



Rocky Bluffs on the Mississippi.

ore susceptible of divergence from their original direction by impediments their path. Hence the tortuous character of the water-courses, chiefly ising from the streams meeting with levels after descending inclined planes, nich so slackens their speed that they are easily diverted from a right-onrd direction by natural obstacles, to which the force of their current is inrior. The Mæander was famed in classical antiquity for its mazy course, scending from the pastures of Phrygia, with many involutions, into the ne-clad province of the Carians, which it divided from Lydia near a plain operly called the Mæandrian, where the bed was winding in a remarkable gree. From the name of this river we have the word meandering, as aped to erratic streams.

This circumstance increases prodigiously the extent of their channels, and nders their navigation tedious, but the absence of that velocity of the curnt which would make it difficult is a compensation, while a larger portion the earth enjoys the benefit of their waters. The sources of the Mississippi e only twelve hundred miles from its mouth, in a straight line, but thirtyo hundred miles, pursuing its real path; and the Forth is actually three nes the length of a straight line drawn from its rise to its termination. The ers which flow through flat alluvial plains frequently exhibit great sinuosis, their waters returning nearly to the same point, after an extensive tour. ne Moselle, after a curved course of seventeen miles, returns to within a v hundred yards of the same spot; and a steamer on the Mississippi, after sail of twenty-five or thirty-miles, is brought round again, almost within hail the place where it was two or three hours before. In high floods, the was frequently force a passage through the isthmuses which are thus formed, nverting the peninsulas into islands, and forming a nearer route for the vigator to pursue. By the "grand cut-off" on the Mississippi, vessels now

pass from one point to another in half a mile, in order to accomplish which they had formerly a distance of twenty miles to traverse.

Rivers receive a peculiar impress from the geological character of the districts through which they flow. Those of primary or transition countries, where sudden declivities abound, are bold and rapid streams, with steep and high banks, and usually pure waters, owing to the surface not being readily abraded, generally emptying themselves by a single mouth which is deep and unobstructed. The streams of secondary and alluvial districts flow with slow but powerful current, between low and gradually-descending banks, which, being composed of soft rocks or alluvial grounds, are easily worn away by the waters, and hence great changes are effected in their channels, and a peculiar color is given to their streams by the earthy particles with which they are charged. Many rivers have their names from this last circumstance. The Rio Negro, or Black river, which flows into the Amazon, is so called on account of the dark color of its waters, which are of an amber hue wherever it is shallow, and dark-brown wherever the depth is great. The names of the two great streams which unite to form the Nile—the Bahr-el-Abiad, or White river, from the mountains of the Moon, and the Bahr-el-Asrek, or Blue river, from Abyssinia—refer to the color which they receive from the quantity of earth with which they are impregnated. The united rivers, for some distance after their junction, preserve their colors distinct. This is the case likewise with the Rhine and the Moselle, the St. Lawrence and the Ottawa. The Upper Mississippi is a transparent stream, but assumes the color of the Missouri upon joining that river, the mud of which is as copious as the water can hold in suspension, and of a white soapy hue. The Ohio brings into it a flood of a greenish color. The bright and dark-red waters of the Arkansas and Red river afterward diminish the whiteness derived from the Missouri, and the volume of the Lower Mississippi bears along a tribute of vegetable soil, collected from the most distant quarters, and of the most various kind—the marl of the Rocky and the clay of the Black mountains—the earth of the Alleganies—and the red-loam washed from the hills at the sources of the Arkansas and the Red river. Mr. Lyell states that water flowing at the rate of three inches per second will tear up fine clay; six inches per second, fine sand; twelve inches per second, fine gravel; and three feet per second, stones of the size of an egg. He remarks, likewise, that the rapidity at the bottom of a stream is everywhere less than in any part above it, and is greatest at the surface; and that in the middle of the stream the particles at the top move swifter than those at the sides. The ease with which running water bears along large quantities of sand, gravel, and pebbles, ceases to surprise when we consider that the specific gravity of rocks in water is much less than in air.

It is chiefly in primary and transition countries that the rivers exhibit those sudden descents which pass under the general denomination of falls, and form either cataracts or rapids. They occur in secondary regions, but more rarely, and the descent is of a more gentle description. The falls are generally found in the passage of streams from the primitive to the other formations. Thus the line which divides the primitive and the alluvial formations on the coast of the United States, is marked by the falls or rapids of its rivers, while none occur in the alluvion below. Cataracts are formed by the descent of a river over a precipice which is perpendicular, or nearly so, and depend, for their sublimity, upon the height of the fall and the magnitude of the stream. Rapids are produced by the occurrence of a steeply-inclined plane, over which the flood rushes with great impetuosity, yet without being projected over a precipice.

The river Adige, in the Tyrol, near Meran, rushes, with resistless force

and deafening noise, down a descent nearly a mile in length, between quiet, green, pastoral banks, presenting one of the most magnificent spectacles to be met with in Europe. The celebrated cataracts of the Nile are, more properly speaking, rapids, as there is no considerable perpendicular fall of the river; but for a hundred miles at Wady Hafal, the second cataract reckoning upward, there is a succession of steep descents, and a multitude of rocky islands, among which the river dashes amid clouds of foam, and is tossed in perpetual eddies.

It is along the course of our American rivers, however, that the most sublime and imposing rapids are found, rendered so by the great volumes of water contained in their channels. The more remarkable are those of the St. Lawrence, the chief of which, called the "Coteau du Luc," the "Cedars," the "Split Rock," and the "Cascades," occur in succession for about nine miles above Montreal and the junction of the Ottawa. At the rapid of St. Anne, on the latter river, the more devout of the Canadian *voyageurs* are accustomed to land, and implore the protection of the patron-saint on their perilous expeditions, before a large cross at the village that bears her name.

The Kaaterskill falls here represented are celebrated for picturesque beauty. The waters which supply these cascades flow from two small lakes in the Catskill mountains, on the west bank of the Hudson. The upper cascade falls one hundred and seventy-five feet, and a few rods below the second pours its waters over a precipice eighty feet high, passing into a picturesque ravine, the banks of which rise abruptly on each side to the height of a thousand to fifteen hundred feet.

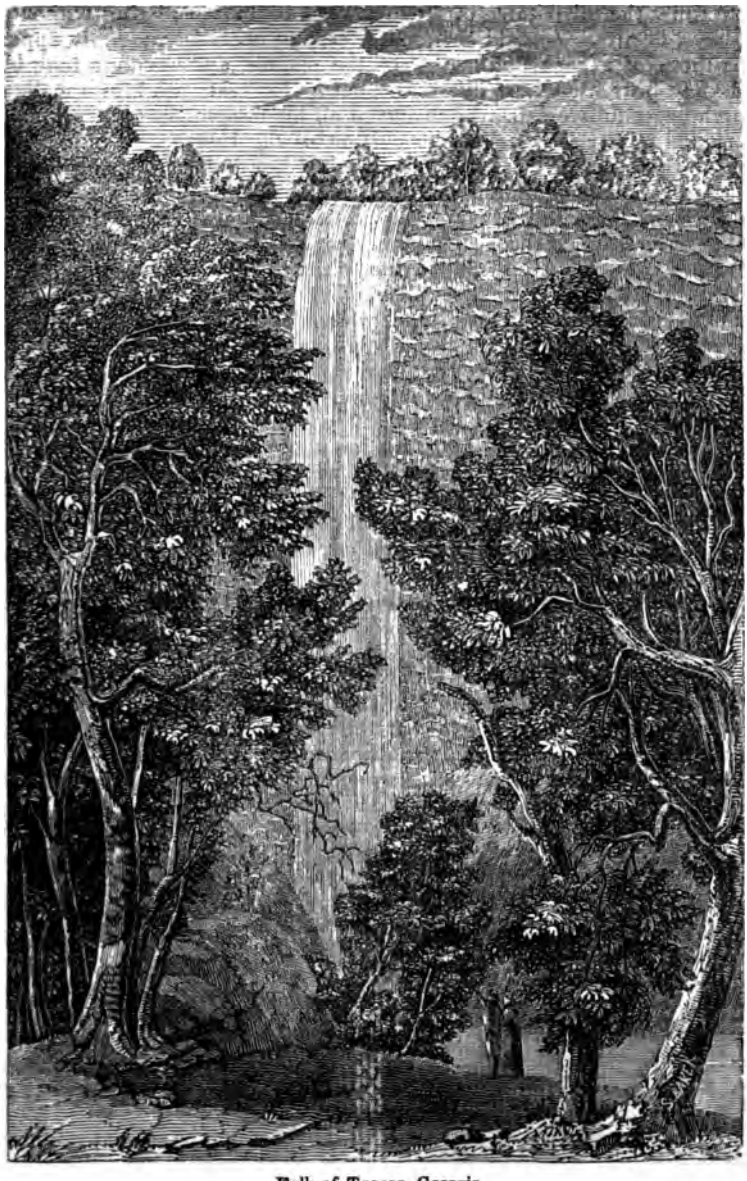
The fall of Toccoa, too (of which a representation is given on page 349), is extremely beautiful and picturesque. It is situated in Habersham county, Georgia; the height of it is 180 feet.

Kaater-kill Falls.

In the grandeur of our cataracts, also, American rivers far surpass those of other countries, though several falls on the ancient continent have a greater perpendicular height, and are magnificent objects. In Sweden, the Gotha falls about one hundred and fifty feet at Trolhetta, the greatest fall in Europe of the same body of water. The river is the only outlet of a lake a hundred miles in length and fifty in breadth, which receives no fewer than twenty-four rivers; the water glides smoothly on, increasing in rapidity, but quite unruffled, until it reaches the verge of the precipice; it then darts over it in one broad sheet, which is broken by some jutting rocks, after a descent of about forty feet. Here begins a spectacle of great grandeur. The moving mass is tossed from rock to rock, now heaving itself up in yellow foam, now boiling and tossing in huge eddies, growing whiter and whiter in its descent, till, completely fretted into one beautiful sea of snowy froth, the spray, rising in dense clouds, hides the abyss into which the torrent dashes; but when momentarily cleared away by the wind, a dreadful gulf is revealed, which the eye can not fathom. Upon the arrival of a visiter at Trolhetta, a log of wood is sent down the fall, by persons who expect a trifle for the exhibition. It displays the resistless power of the element. The log, which is of gigantic dimensions, is tossed like a feather upon the surface of the water, and is borne to the foot almost in an instant. In Scotland, the falls of its rivers are seldom of great size; but the rocky beds over which they roar and dash in foam and spray—the dark precipitous glens into which they rush—and the frequent wildness of the whole scenery around—are compensating features. The most remarkable instances are the Upper and Lower falls of Foyers, near Loch Ness. At the upper fall, the river precipitates itself, at three leaps, down as many precipices, whose united depth is about two hundred feet; but at the lower, it makes a descent at once of two hundred and twelve feet, and, after heavy rains, exhibits a grand appearance. The fall of the Rhine at Schaffhausen is only seventy feet; but the great mass of its waters, four hundred and fifty feet in breadth, gives it an imposing character. The Teverone, near Tivoli, a comparatively small stream, is precipitated nearly one hundred feet; and the Velino, near Terni, falls three hundred, which is generally considered the finest of European cataracts. This "bell of waters," as Byron calls it, is of artificial construction. A channel was dug by the consul Carius Dentatus, in the year 274 B. C., to convey the waters to the precipice, but having become filled up by a deposition of calcareous matter, it was widened and deepened by order of Pope Paul IV.

In the Alpine highlands, the Evanson descends upward of 1,200 feet, and the Orco forms a vertical cataract of 2,400; but in these instances the quantity of water is small, and the chief interest is produced by the height from which it falls. At Staubbach, in the Swiss canton of Berne, a small stream descends 1,400 feet, which is scattered almost entirely into spray before it reaches the bottom.

Waterfalls appear upon their grandest scale in our continent. They are not only remarkable for the height of the precipices over which they descend, but for the picturesque forms of the rocky cliffs amid which they are precipitated. The majority are in the northern part of the continent, but the greatest vertical descent of a considerable body of water is in the southern, at the falls of Tequendama, where the river of Funza disembogues from the elevated plain or valley of Santa Fe de Bogota. This valley is at a greater height above the level of the sea than the summit of the great St. Bernard, and is surrounded by lofty mountains. It appears to have been formerly the bed of an extensive lake, whose waters were drained off when the narrow passage was forced through which the Funza river now descends from the



Falls of Toccoa, Georgia.

elevated enclosed valley toward the bed of the Rio Magdalena. Respe this physical occurrence, Gonzalo Ximenes de Quesada, the conqueror o country, found the following tradition disseminated among the people, w probably contains a stratum of truth invested with a fabulous legend. remote times the inhabitants of Bogota were barbarians, living without gion, laws, or arts. An old man on a certain occasion suddenly appe among them, of a race unlike that of the natives, and having a long b beard. He instructed them in the arts, but he brought with him a malig although beautiful woman, who thwarted all his benevolent enterprises. her magical power she swelled the current of the Funza, and inundate valley, so that most of the inhabitants perished, a few only having found uge in the neighboring mountains. The aged visiter then drove his co from the earth, and she became the moon. He next broke the rocks enclosed the valley on the Tequendama side, and by this means draine the waters. Then he introduced the worship of the sun, appointed chiefs, and finally withdrew to a valley, where he lived in the exercise o most austere penitence during 2,000 years. The Tequandama catara remarkably picturesque. The river a little above it is one hundred and ty-four feet in breadth, but at the crevice it is much narrower. The h of the fall is five hundred and seventy-four feet, and the column of vapo rises from it is visible from Santa Fe at the distance of seventeen miles. the foot of the precipice the vegetation has a totally different appearance that at the summit, and the traveller, following the course of the river, p from a plain in which the cereal plants of Europe are cultivated, and w abounds with oaks, elms, and other trees resembling those of the temp regions of the northern hemisphere, and enters a country covered with p bananas, and sugar-canes.

In North America, however, we find the greatest of all cataracts, th the Niagara, the sublimest object on earth, according to the general op of all travellers. More varied magnificence is displayed by the ocean, giant masses of the Andes and Himalaya; but no single spectacle is so king and wonderful as the descent of this sea-like flood, the overplus of extensive lakes. The river is about thirty-three miles in length, exte from Lake Erie to Lake Ontario, and three quarters of a mile wide at the There is nothing in the neighboring country to indicate the vicinity o astonishing phenomenen here exhibited. Leaving out Lake Erie, the tr ler passes over a level though somewhat elevated plain, through whic river flows tranquilly, bordered by fertile and beautiful banks; but s deep awful sound, gradually growing louder, breaks upon the ear—the of the distant cataract. Yet the eye discerns no sign of the spe about to be disclosed until a mile from it, when the water begins to ri and is broken into a series of dashing and foaming rapids. After pa these the river becomes more tranquil, though rolling onward with tre dous force, till it reaches the brink of the great precipice. The fall its divided into two unequal portions by the intervention of Goat island, a f near 1,000 feet in breadth. The one on the British side of the river, c the Horseshoe fall from its shape, according to the most careful estima 2,100 feet broad, and 149 feet 9 inches high. The other, or American is 1,140 feet broad, and 164 feet high. The former is far superior t latter in grandeur. The great body of the water passes over the pre with such force, that it forms a curved sheet which strikes the stream b at the distance of fifty feet from the base, and many travellers have tured between the descending flood and the rock itself. The quantit water rolling over these falls has been estimated at 670,250 tons per mi

s impossible to appreciate the scene created by this immense torrent, rt from its site.

'here have been several hairbreadth escapes, and not a few fatal acci- ts, at Niagara, the relation of which is highly illustrative of Indian mag- imity. Tradition preserves the memory of the warrior of the red race o got entangled in the rapids above the falls, and, seeing his fate inevita- , calmly resigned himself to it, and sat singing in his canoe till buried by torrent in the abyss to which it plunges. The celebrated Chateaubriand rowly escaped a similar fate. On his arrival he had repaired to the fall, ing the bridle of his horse twisted round his arm. While he was stopping ook down, a rattlesnake stirred among the neighboring bushes. The horse s startled, reared, and ran back toward the abyss. He could not disen- ge his arm from the bridle; and the horse, more and more frightened, gged him after him. His forelegs were all but off the ground; and, squat- g on the brink of the precipice, he was upheld merely by the bridle. He 'e himself up for lost; when the animal, astonished at this new danger, ew itself forward with a pirouette, and sprang to the distance of ten feet m the edge of the abyss.

The erosive action of running water, which is urging the Niagara falls vard Lake Erie, is strikingly exhibited by several rivers which penetrate ough rocks and beds of compact strata, and have either scooped out their n passage entirely, or widened and deepened original tracks and fissures the surface, into enormous wall-sided valleys. The current of the Simeto he largest Sicilian river round the base of Etna—was crossed by a great eam of lava about two centuries and a half ago; but, since that era, the er has completely triumphed over the barrier of homogeneous hard blue k that intruded into its nnel, and cut a passage ough it from fifty to undred feet broad, and m forty to fifty feet ep. The formation of magnificent rock- dge which overhangs course of the Cedar ek, one of the natu- wonders of Virginia, very probably due in rt to the solvent and rading power of the eam. This sublime cu- sity is 213 feet above river, 60 feet wide, long, and the thick- ss of the mass at the nmit of the arch is out 40 feet. The bridge a coating of earth, ich gives growth to veral large trees. Few ve resolution enough walk to the parapet order to peep over it. it if the view from the

Natural Bridge, Virginia.

top is painful and intolerable, that from below is pleasing in an equal degree. The beauty, elevation, and lightness of the arch, springing as it were up to heaven, present a striking instance of the graceful in combination with the sublime. This great arch of rock gives the name of Rockbridge to the county in which it is situated, and affords a public and commodious passage over a valley which can not be crossed elsewhere for a considerable distance. Under the arch, thirty feet from the water, the lower part of the letters G. W. may be seen carved on the rock. They are the initials of Washington, who, when a youth, climbed up hither, and left this record of his adventure.

We have several examples of the disappearance of rivers, and their emergence after pursuing for some distance a subterranean course. In these cases a barrier of solid rock, overlaying a softer stratum, has occurred in their path; and the latter has been gradually worn away by the waters, and a passage been constructed through it. Thus the Tigris, about twenty miles from its source, meets with a mountainous ridge at Diglou, and, running under it, flows out at the opposite side. The Rhone, also, soon after coming within the French frontier, passes under ground for about a quarter of a mile.

The Hamps and the Manifold, likewise—two small streams in Derbyshire—flow in separate subterraneous channels for several miles, and emerge within fifteen yards of each other in the grounds of Ilam Hall. That these are really the streams which are swallowed up at points several miles distant, has been frequently proved by watching the exit of various light bodies that have been absorbed at the swallows. At their emergence the waters of the two rivers differ in temperature about two degrees—an obvious proof that they do not anywhere intermingle.

In Spain a similar phenomenon is exhibited by the Guadiana; but it occurs under different circumstances. It disappears for about seven leagues—an effect of the absorbing power of the soil—the intervening space consisting of sandy and marshy grounds, across which the road to Andalusia passes by a long bridge or causeway. The river reappears with greater power, after its dispersion, at the Ojos de Guadiana—the Eyes of the stream.

Many rivers are subject to a considerable elevation of the level of their waters. This is periodical or irregular in its occurrence, according to the nature of the producing cause. Casual temporary floodings, as the effect of extraordinary rains, are common to the streams of most countries, and sometimes occasion great changes of the surface, and destruction of life and property.

Most of the rivers of the temperate zones are subject to these irregular floodings from the same cause, especially those which take their rise in high mountain regions, the St. Lawrence being the most remarkable exception, the level of which is not affected by either rains or drought. The vast lakes from which this river issues, furnish its channel with an inexhaustible supply of water, and present a surface too extensive to be sensibly elevated by any extraordinary rains. A strong westerly wind, however, will affect the level of the St. Lawrence, and occasion a rise of six feet in the waters to the eastern extremity of Lake Erie. An easterly wind also on the Orinoco will check its current, elevate the upper part of the stream, and force its waters into the channels of its tributaries, giving them a backward flow, and causing them to be flooded; and a northerly wind will drive the Baltic up the mouths of the Oder, and raise its level for a considerable distance. In a similar manner, the Neva rises when a strong wind blows from the gulf of Finland; and that occurrence, taking place coincidently with high water and the breaking up of the ice, would create an inundation sufficient to drown the whole population of St. Petersburg, and convert that brilliant capital, with all

its sumptuous palaces, into a chaotic mass of ruins. We have the materials of this statement from M. Kohl. The gulf of Finland runs to a point as it approaches the mouth of the Neva, where the most violent gales are always those from the west; so that the mass of waters on such occasions is always forcibly impelled toward the city. The islands forming the delta of the Neva, on which St. Petersburg stands, are extremely low and flat; and the highest point in the city is probably not more than twelve or fourteen feet above the average level of the sea. A rise of fifteen feet is therefore enough to place all St. Petersburg under water, and a rise of thirty feet is enough to drown almost every human being in the place. Hence the inhabitants of the capital are in constant danger of destruction at the period referred to, and can never be certain that the 500,000 of them may not, within the next twenty-four hours, be driven out of their houses, to find, in multitudes of instances, a watery grave. This is not a chimerical danger; for, during its short continuance, the city of the czar has experienced some formidable inundations. The only hope of this apparently doomed city is, that the three circumstances may never be coincident, namely, high water, the breaking up of the ice, and a gale of wind from the west. It is nevertheless true, that the wind is very often westerly during spring, and the ice floating in the Neva and the gulf of Finland is of a bulk amply sufficient to oppose a formidable obstacle to the egress of the water; so that it will not be surprising if St. Petersburg, after suddenly rising like a meteor from the swamps of Finland, should still more suddenly be extinguished in them.

The periodical rise of rivers is either diurnal, semi-annual, or annual, and proceeds from a variety of causes. Where streams descend immediately from mountains covered with snow, the heat of the sun melting the snow produces high water every day, the increase being the greatest in the hottest days. In Peru and Chili there are small rivers which flow only during the day, because they are fed entirely by the melting of the snow upon the summit of the Andes, which takes place only when the solar influence is in action. In Hindostan, and some parts of Africa, rivers exist, which, though they flow night and day, are, from the accession of snow-water, the greatest by day. Those rivers also which fall into the sea have their level daily varied by the tidal wave for some distance from their mouths, the extent through which the influence of the tides is felt being modified by the breadth and shape of their channels and the force of their current. The wider and more direct the bed of a stream communicating with the ocean, and the slower its motion, the further the tide will penetrate; whereas, a narrow and sinuous course, and a great velocity, offer obstructions to its progress. The tide of the Atlantic is perceived four hundred miles along the course of the Amazon, and that of the German ocean extends about seventy miles up the Thames. Important facilities are afforded to the navigation of many rivers by this circumstance, for they are only accessible to vessels of large burden at high water. The rapid of Richelieu, on the St. Lawrence, where the river contracts, and has its course obstructed by rocks, impedes the navigation between Montreal and Quebec, except at high tide, when the water rises fifteen or eighteen feet, and the rapid entirely disappears.

A semi-annual or an annual rise alone distinguishes the rivers of intertropical regions and of countries bordering on the torrid zone. The semi-annual rise is a feature of those rivers which drain high mountain-ranges, and proceeds from the two independent causes, of the melting of the snows in spring or summer, and the great seasonal rains to which such districts are subject. The rivers which have only one annual rise are influenced by the latter cause alone, or by the two acting coincidently, and producing a grand

periodical flood. The Tigris rises twice in the year—first and most remarkably in April, in consequence of the melting of the snows in the mountains of Armenia; and secondly in November, through an accession from the periodical rains. The Mississippi likewise is subject to two rises in the year: one about January, occasioned by the periodical rains that fall toward the lower part of its course; but the grand flood commences in March, and continues till June, proceeding from the melting of the ice in the upper part of the continent, where the Missouri and other tributary streams have their origin. A very striking spectacle is exhibited by this river in the season of inundation. It rises from forty to fifty feet in some parts of its course, and is from thirty to a hundred miles wide, all overshaded with forest, excepting the interior stripe consisting of its bed. The water stands among the trees, from ten to fifteen feet in height, and the appearance is exactly that of a forest rising from a lake, with its waters in rapid motion. For the protection of the cultivated lands, and to prevent their conversion into permanent swamps, an embankment, called the Levee, has been raised, which extends two hundred miles on the eastern shore of the river, and three hundred on the western. In Asia, the Ganges, Indus, and Euphrates, exhibit inundations upon a similarly great scale. The Euphrates slightly increases in January, but the grand flood begins soon after the middle of March. It attains its height about the 20th of May, after which it falls rapidly till June. The decrease then proceeds gradually until the middle of November, when the stream is at its lowest. The rise of the water at Anah, above the site of ancient Babylon, occasionally amounts to eighteen feet, sometimes entering that town, running with a velocity exceeding five miles an hour. The moment that the waters of the river recede, the rice and grain crops are sown in the marshes, and villages of slightly-made reed cottages are reared in their neighborhood. These last, in consequence of being suffered to remain too long, are often surprised by the returning inundation, and it is no uncommon spectacle for their occupants to be seen following the floating villages in canoes, for the purpose of recovering their property.

But of all inundations, that of the Nile, if not the most extensive, is the most regular, and has become the most celebrated, from the knowledge of its going back to the earliest periods to which history recurs. The rise of the river commences about the time of the summer solstice, attains its maximum height at the autumnal equinox, remains stationary for some days, and then gradually diminishes till the time of the winter solstice. The ancients, unacquainted with the climate of the interior country from which it descends, and not caring in general to inquire for physical causes, possessing also a very limited knowledge of terrestrial phenomena, deemed the annual overflow of the Nile a unique event, and attributed it to the special interference of a supernatural power. Lucretius, however, who soared in many respects above the prejudices of his age concerning the natural world, assigned it to a proper cause; though he ascribes too much influence to the Etesian winds, and shows his imperfect acquaintance with the geography of the globe, by supposing the occurrence without a parallel.

The annual overflow of the Nile is now well known to proceed from the heavy periodical rains within the tropics. They fall in copious torrents upon the great plateau of Abyssinia, which rises, like a fortress, six thousand feet above the burning plains with which it is surrounded on every side, attracting the clouds, cold fogs, and tremendous showers, enveloping An Rober, the capital, while, whenever the curtain of mist is withdrawn, the strange contrast is presented of the sulphureous plains, visible below, where the heat is ninety degrees, and the drought excessive. A peculiar character has been given

this district by the violence of the periodical rains. Bruce speaks of the ountains of this table-land, not remarkable for their height, but for their umber and uncommon forms. "Some of them are flat, thin, and square, in ape of a hearthstone or slab, that scarcely would seem to have base suffiient to resist the winds. Some are like pyramids, others like obelisks or risms, and some, the most extraordinary of all, pyramids pitched upon their oints, with their base uppermost." Mr. Salt confirms this delineation in the ain. The peculiar shapes referred to have been formed by the action of e torrents discharged from the clouds, which have for ages been skeletoning the country, dismantling the granite with its kindred masses of the softer eposites, gradually wearing away also these harder rocks, and carrying long the soil of Ethiopia, strewing it upon the valley of the Nile, to the hores of the Mediterranean. When Bruce was ascending Taranta, a sudeu noise was heard on the heights louder than the loudest thunder, and, almost directly afterward, a river, the channel of which had been dry, came own in a stream several feet in depth, and as broad as the whole bed. Hence he steeple and obelisk form of the rocks, with their naked aspect—which has, ot unaptly, been compared to bones stripped of their flesh.

In the tropical countries of South America, the seasonal rains are perhaps nore intensely copious than in any other part of the torrid zone, and the floods f its rivers are of corresponding magnitude. At the mission of San Antonio de avita, on the Orinoco, during the wet season, the sun and stars are seldom isible, and Humboldt was told by the padre that it sometimes rained for four nd five months without intermission. The traveller collected there, in five ours, twenty-one lines of water in height on the 1st of May, and fourteen ines on the 3d in three hours; whereas, at Paris there fall only twenty-eight r thirty lines in as many weeks. Humboldt traces the transition from the ne great season of drought to that of rain, which divides the year, in an ineresting manner, with the atmospheric phenomena which accompany the hange. About the middle of February in the valleys of Araqua, he observed louds forming in the evening, and in the beginning of March the accumulaion of vesicular vapors became visible. "Nothing," he remarks, in beautiully graphic style, "can equal the purity of the atmosphere from December o February. The sky is then constantly without clouds, and should one apear, it is a phenomenon that occupies all the attention of the inhabitants. The breeze from the east and northeast blows with violence. As it always arries with it air of the same temperature, the vapors can not become visible y refrigeration. Toward the end of February and the beginning of March he blue of the sky is less intense; the hygrometer gradually indicates greater umidity; the stars are sometimes veiled by a thin stratum of vapors; their ight ceases to be tranquil and planetary; and they are seen to sparkle from ime to time at the height of twenty degrees above the horizon. At this peiod the breeze diminishes in strength, and becomes less regular, being more requently interrupted by dead calms. Clouds accumulate toward the southast, appearing like distant mountains with distinct outlines. From time to ime they are seen to separate from the horizon, and traverse the celestial ault with a rapidity which has no correspondence with the feebleness of the vind that prevails in the lower strata of the air. At the end of March the outhern region of the atmosphere is illuminated by small electric explosions, ike phosphorescent gleams, confined to a single group of vapors. From this eriod the breeze shifts at intervals, and for several hours, to the west and outhwest, affording a sure indication of the approach of the rainy season, vhich, on the Orinoco, commences about the end of April. The sky begins o be overcast, its azure color disappears, and a gray tint is uniformly diffused

over it. At the same time the heat of the atmosphere gradually increases, and, instead of scattered clouds, the whole vault of the heavens is overspread with condensed vapors. The howling monkeys begin to utter their plaintive cries long before sunrise. The atmospheric electricity, which, during the period of the greatest drought, from December to March, had been almost constantly in the daytime from 1·7 to 2 lines of Volta's electrometer, becomes extremely variable after March. During whole days it appears null, and again, for some hours, the pith-balls of the electrometer diverge from three to four lines. The atmosphere, which in the torrid as in the temperate zone is generally in a state of positive electricity, passes alternately, in the course of eight or ten minutes, to a negative state. The rainy season is that of thunder-storms. The storm rises in the plains two hours after the sun passes through the meridian, and therefore shortly after the period of the maximum of the diurnal heat in the tropics. In the inland districts it is exceedingly rare to hear thunder at night or in the morning, nocturnal thunder-storms being peculiar to certain valleys of rivers which have a particular climate."

The substance of the explanation of the preceding phenomena, by the philosophic writer of the statement, may be briefly given: The season of rains and thunder in the northern equinoctial zones coincides with the passage of the sun through the zenith of the place, the cessation of the breezes, or northeast winds, and the frequency of calms, and furious currents of the atmosphere from the southeast and southwest, accompanied with a cloudy sky. While the breeze from the northeast blows, it prevents the atmosphere from being saturated with moisture. The hot and loaded air of the torrid zone rises, and flows off again toward the poles, while inferior currents from these last, bringing drier and colder strata, take the place of the ascending columns. In this manner the humidity, being prevented from accumulating, passes off toward the temperate and colder regions, so that the sky is always clear. When the sun, entering the northern signs, rises toward the zenith, the breeze from the northeast softens, and at length ceases; this being the season at which the difference of temperature between the tropics and the contiguous zone is least. The column of air resting on the equinoctial zone becomes replete with vapors, because it is no longer renewed by the current from the pole; clouds form in this atmosphere, saturated and cooled by the effects of radiation and the dilatation of the ascending air, which increases its capacity for heat in proportion as it is rarefied. Electricity accumulates in the higher regions, in consequence of the formation of the vesicular vapors, the precipitation of which is constant during the day, but generally ceases at night. The showers are more violent, and accompanied with electrical explosions, shortly after the maximum of the diurnal heat. These phenomena continue until the sun enters the southern signs, when the polar current is re-established, because the difference between the heat of the equinoctial and temperate regions is daily increasing. The air of the tropics being thus renewed, the rains cease, the vapors are dissolved, and the sky resumes its azure tint.

The Orinoco, when in flood, inundates a vast extent of country, six hundred miles in length and from sixty to ninety in breadth. Its waters cover the savannahs along its banks to the depth of twelve or fourteen feet, giving to them a lake-like appearance, in the midst of which farmhouses and villages are seen rising on islands but little elevated above the surface. The wild cattle perish in great numbers, and fall an easy prey to the carrion-vultures and alligators. In one part of the river Humboldt found marks of recent inundation at forty-five feet above the ordinary level; but above the greatest height to which its waters are now elevated, he traced its ancient action at one hundred and six and even one hundred and thirty-eight feet. "Is this river, then,"

inquires he, "the Orinoco, which appears to us so imposing and majestic, merely the feeble remnant of those immense currents of fresh water which, swelled by Alpine snows or by more abundant rains, everywhere shaded by dense forests, and destitute of those beaches that favor evaporation, formerly traversed the regions to the east of the Andes, like arms of inland seas? What must then have been the state of those low countries of Guiana, which now experience the effects of annual inundations! What a prodigious number of crocodiles, lamartines, and boas, must have inhabited these vast regions, alternately converted into pools of stagnant water and arid plains! The more peaceful world in which we live has succeeded to a tumultuous world. Bones of mastodons and real American elephants are found dispersed over the platforms of the Andes. The megatherium inhabited the plains of Uruguay. By digging the earth more deeply in high valleys, which at the present day are unable to nourish palms or tree-ferns, we discover strata of coal, containing gigantic remains of monocotyledonous plants. There was therefore a remote period when the tribes of vegetables were differently distributed, when the animals were larger, the rivers wider and deeper. There stop the monuments of nature which we can consult."

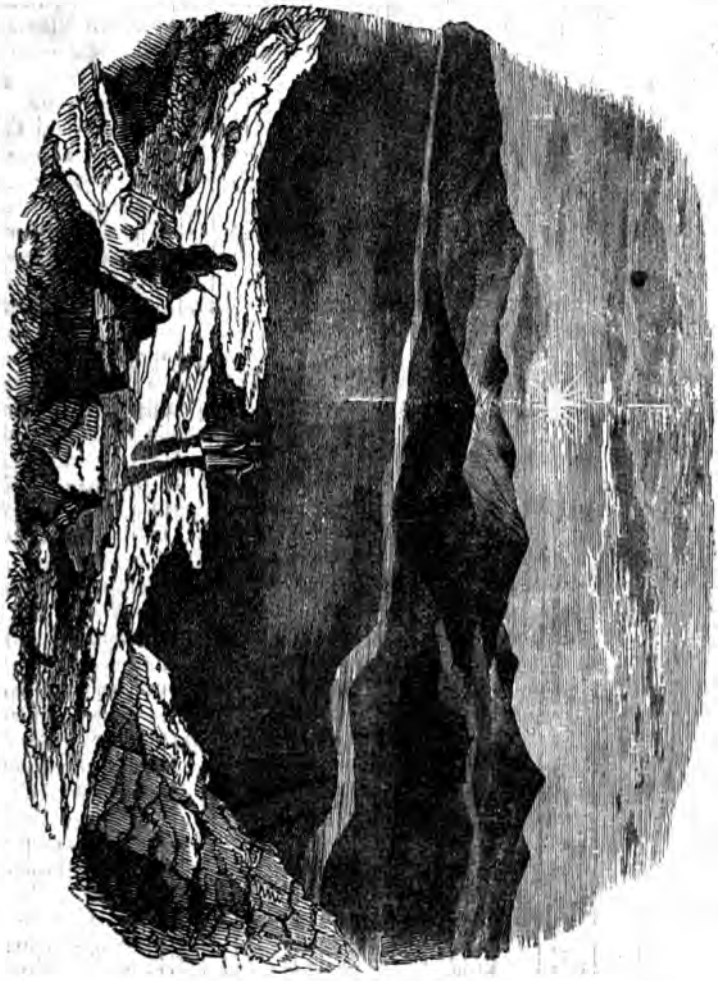
The bifurcation of flowing waters is sufficiently illustrative of the physics of the earth to justify a few words: Europe presents two instances of bifurcation: one in Italy, between the Arno and the Chiana; the other in Germany, between the Haase and the Else, in Westphalia. Asia also possesses, on the peninsula lying beyond India, two grand examples. What we know about them is principally founded upon the informations gathered by Dr. Buchanan Hamilton, during his stay in Ava, the capital of the Birman empire. But it is to be observed that the communications of these Indian rivers—at least as regards those in the country of the Jun-Shan—appear doubtful. British travellers have succeeded in penetrating, from Maulmain, at the mouth of the river Saluan, into the interior of the country of the Shan, which has been so long shut up; but Lieutenant M'Leod, who reached the river of Kambodja, says nothing to confirm the information Dr. Buchanan gives us. The most important of all known divisions in the form of a fork, however, is the bifurcation of the Orinoco, which communicates through the Cassiquiare with the Rio Negro, and through this river with the Amazon. The observations of A. von Humboldt have put this bifurcation beyond a doubt. The subject presents to our attention a singular physical feature, and illustrates the energy of the great traveller of modern times.

He and Bonpland left Caraccas in the year 1800, crossed the valleys of Aragua, and the Llanos of Calabozo—excellent pastures, which separate the cultivated part of Venezuela from the region of the forests and missions—and embarked at San Fernando, on the Rio Apure, to follow its course downward to its discharge into the principal branch of the Orinoco. They then ascended the Orinoco, passing its two great cataracts of Apures and Maypures, and reached the village of San Fernando de Atabapo, situated at the junction of the Guaviare and Atabapo, and near latitude four degrees north. Here they left the river, and sailed up the Atabapo to the mouth of the Rio Temi, which latter they followed as far as its confluence with the Tuamini, and arrived at the village of San Antonio de Javita, formerly mentioned as remarkable for its amount of rain. From this point the Indians carried their boat across the isthmus which separates the Tuamini from the Rio Pimichin, the travellers following on foot, passing through dense forests, often in danger from the number of snakes that infested the marshes. Embarking on the Pimichin, they came in four and a half hours into the Rio Negro. "The morning," says Humboldt, "was cool and beautiful. We had been confined thirty-six

days in a narrow canoe, so unsteady that it would have been upset by any one rising imprudently from his seat, without warning the rowers to preserve its balance by leaning to the opposite side. We had suffered severely from the stings of insects, but had withstood the insalubrity of the climate; we had passed without accident the numerous falls and bars that impede the navigation of the rivers, and often render it more dangerous than long voyages by sea. After all we had endured, I may be allowed to mention the satisfaction which we felt in having reached the tributaries of the Amazon." The Rio Negro, which flows into that river, was navigated downward as far as San Carlos, then supposed to lie under the equator, but actually about two degrees north. Thence the travellers retraced the river, passed from it into the Cassiquiare, and again entered the main channel of the Orinoco, three leagues below the mission of Esmeralda; thus demonstrating a junction between the two great floods of the Amazon and Orinoco, which had been, in the year 1798, declared by Bauche to be a geographical monstrosity. The bifurcation of the Orinoco takes place in the following manner: The river, issuing from among the mountains, reaches the opening of a valley or depression which terminates at the Rio Negro. Here it divides into two branches—the smaller, or the Cassiquiare, turning off to the south, while the main stream continues its original direction, west-northwest.

The preceding notices refer to what have been appropriately styled the "mighty rivers," and the "great rivers," none of which are to be found in Europe. Its noblest running waters belong to a third grade, though one or two exceptions may be regarded as belonging to a second. The small rivers, with the streams subordinate to them, are especially rife in countries where there is the vicinage of the sea, and high elevations on land. This renders them so abundant in such districts as the Greek peninsula. There, Alpine tracts of territory collect from the atmosphere the vapors of the contiguous sea, arrest the castellated glories of cloud-land, and awaken in the valleys and plains the refreshing music of the voice "of many waters." The commerce of kingdoms distinguishes not the rivers of this classic soil, but they are familiar with the charms of nature, add effect to the sublime and wild in its scenery, and clothe with heightened grace the soft and pastoral.

The high lands and the contiguous sea, operate, in Judea, to render it a well-watered country—a "land of brooks," according to its scripture designation. There are no considerable rivers, owing to the scanty extent of its hydrographical basins; but the melting of the snow on the high mountains of Syria, and the periodical sound of "an abundance of rain," contribute to furnish an ample irrigation. Its principal stream—the Jordan—though only one of the fifth class, and not remarkable for picturesque beauty, except in the upper part of its course, has a sacred and historic interest which will always strongly attract attention to it, while it exhibits a singular physical peculiarity. This is the depression of the valley, in which it flows, below the level of the Mediterranean, through the whole distance between the sea of Tiberias and the Dead sea; and the great inclination of its descent from the one to the other, amounting at a mean to very nearly eighteen feet per mile. Hence the force of its current, notwithstanding a comparatively small volume of water, and the few windings that mark its channel. Speaking of its appearance near the site of Jericho, Dr. Robinson states: "There was a still though very rapid current. We estimated the breadth of the stream to be from eighty to one hundred feet. The guides supposed it now to be ten or twelve feet deep. The current was so strong, that even Komeh, a stout swimmer of the Nile, was carried down several yards in crossing." Upon the authority of some phrases in the English version of the Scriptures, which



The River Jordan.

perhaps do not express the sense of the original Hebrew, it has been generally supposed that the Jordan periodically inundated the country in its neighborhood, at, and for some time after, the Israelitish conquest of it. If this were so, either the river must have worn for itself a deeper bed, or the quantity of rain in Palestine must have largely diminished, for there is now no overflow of its banks. At present, the "swellings of Jordan"—one of the phrases alluded to—amount only to a slight annual rise. Copious rains descend upon the mountains round its sources, and the melting of the snows of Lebanon supply numerous temporary torrents; but these contributions are received into the capacious basins of the lakes Merom and Tiberias, and are there spread over an extensive surface, so as to prevent the level of the river from rising into inundation.

In exactly the same manner, the great American lakes prevent any rise to the St. Lawrence, by the immense floods that rush into them in the spring, spreading over their vast beds, and producing only an almost inappreciable elevation of their level. Lebanon, the feeder of the Jordan from its internal reservoirs, along with "Abana and Pharpar, rivers of Damascus," and the Orontes, gives birth to many rapid and brawling streams, and a thousand cascades, when its snows melt, which strikingly displays the erosive power of running water. Deep passages have been cut in the rocks, bestrided by natural arches, like the rock-bridge of Virginia. Of this description is the natural bridge over the Ain el Leban, rising nearly two hundred feet above the torrent which has gradually dug the excavation, as annually the spring has renewed its strength. The brook flows into the Beyrout river, and its channel would be quite dry in summer, were it not for the impediments its mountain course presents. It was the spring season, the time of the melting of the snow, when the monarch of Israel, during his temporary exile from the throne, retreated for a refuge toward the fastnesses of Lebanon. He saw the torrents falling from height to height into the valleys. He heard the voices of the waters as they leaped from rock to rock. His imagination converted this external scenery into a picture of the force of his adversities; and hence the allusion, in the plaintive elegiac, commemorative of his condition, to the "noise of cataracts," and to "deep calling unto deep."

In advancing toward their termination, and at their embouchure, the great rivers present several striking peculiarities. It has already been remarked, that a junction of two large streams often occurs without any expansion of the surface of their waters being the consequence, but a greater velocity of current and depth of channel. In some cases, instead of a wider course being created by increased volume of water, there is actually a narrower bed. Thus the Mississippi is a mile and a half wide, and the Missouri half a mile wide, at their confluence, yet from that point to the mouth of the Ohio, the medium width of the united rivers is but three quarters of a mile, and through the lower parts of its course the main stream has, if anything, a less surface-breadth, though vast accessions are made to it by the Arkansas, Red river, and others of great depth and body of water. Most of the tributaries of the Mississippi also are wider a thousand miles apart from it than at the point of junction, and the same feature is characteristic of other great streams, that as they increase their volume of water, and approach their termination, they flow in narrower though deeper channels. The Nile is not so broad at Cairo as at Siout, nor so broad at Siout as at Thebes. At Assouan, high up the stream, it is 3,900 feet wide; at Oudi, 36 miles above Cairo, it is 2,900; and at Rosetta, near its mouth, but 1,800. This is one of the many examples of benign adjustment with which the realms of nature teem; for hereby, a rich legacy of fertile soil, usually found at the mouths of rivers, is saved from sub-

Natural Bridge of Ain el Leban.

mergence, and becomes the inheritance of man. In the r junction with the sea, rivers display the diversity of sometimes pouring forth their waters through a single mouth, and distributing them into a variety of channels; circumstances mainly dependent upon the country through which they flow, being easily susceptible of excavation or not, and upon the power of the stream.

The Volga is celebrated for its seventy mouths; and the Ganges, the Nile, Mississippi, and Orinoco, pour out their current through several branches. The space enclosed within these various channels is called a delta, from its triangular form, and general resemblance to the shape of the Greek letter Δ. So powerfully do many of the great rivers rush into the ocean, that their waters are distinct from those of the briny deep, when out of sight of the land. A British fleet lying opposite to the mouth of the Rhone, occasionally took up fresh water at a considerable distance from the shore; and Columbus found his vessel in the fresh water of the Orinoco before he discovered the continent of South America. The collision of a great river current and the opposing tide of the sea, is sometimes so violent as to occasion an elevated ridge of waters, heaving and tossing in a tremendous manner, shattering to pieces the illfated vessel that comes into contact with it. The passage of the Garonne into the bay of Biscay, and of the Ganges into the bay of Bengal, exhibit this phenomenon. Upon the rivers meeting the advancing tides, a conflict ensues for the mastery, and the force of the sea triumphing in the struggle, often sends a mountain-wave up the streams, overturning boats, inundating the banks, and causing extensive destruction. The most remarkable example of this struggle for empire, between the waters of the land and of the deep, occurs off the mouth of the Amazon, and is the Indian *pororoca*. When the tide flows out of the river, it pours forth its unshackled current with greater fury, and meeting at right angles with the ocean current that runs from Cape St. Roque along the northeast coast of Brazil, the shock of these two bodies raises their waters into an embankment, upward of a hundred feet in height. The roar of the clashing waves is heard for miles around, and the fishermen and mariners fly in terror from the scene till the strife is over, speedily to be renewed.

In treating of the magnitude of rivers, some writers refer to the elevation of the range of mountains from which they descend; and it is obviously true, that the greater the height of the mountains, the more extensive are their snows and glaciers, and the larger the supply of water furnished by springs and torrents. But the magnitude of a stream is more especially regulated by the extent of country which forms the declivities of its basin, though there is no invariable proportion here, for a small basin in a humid region will yield a greater quantity of water than one much more considerable in a different situation. High mountains, a humid climate, and a wide superficial drainage, are the three physical circumstances which lead to the accumulation of vast bodies of water, the magnitude of which will be proportionate to the degree in which these causes are in combined operation. Upon the surface of the New World, we have these causes acting with greater intensity than upon that of the old, which explains the superior character of the streams of the western continent.

Malte Brun estimates that, representing all the waters discharged by the European rivers by unity, the Black sea receives 0·273; the Caspian, 0·165; the Mediterranean, sea of Marmora, and Archipelago, 0·144; the Atlantic ocean, 0·131; the Baltic, 0.129; the North sea, 0·110; the arctic Frozen ocean, 0·048. The annexed table has a character of universal interest, and naturally finds a place here.

Rivers.	Locality.	Rise.	Discharge.	Length.
n.	Brazil.	Andes.	Atlantic ocean.	3,200
	Mongolia.	Khan Ola mountains.	Sea of Okotsk.	2,240
apootra.	Thibet.	Himalaya mountains.	Bay of Bengal.	1,500
iel Norte.	Mexico.	Sierra Verde.	Gulf of Mexico.	1,250
lo.	North America.	Unknown.	Gulf of California.	700
ia.	North America.	Rocky mountains.	Pacific ocean.	1,090
	Africa.	Lake Aquilunda.	Atlantic ocean.	1,400
.	Germany.	Black Forest.	Black sea.	1,630
r.	Russia.	Heights of Smolensk.	Black sea.	1,050
er	Russia.	Carpathian mountains.	Black sea	480
	Russia.	Lake Ivanhof.	Sea of Azof.	860
	Spain and Portugal.	Mountains of Sovia.	Atlantic ocean.	455
	Russia.	Heights of Vologda.	White sea.	425
	Spain.	Mountains of Asturias.	Mediterranean sea.	410
the ancient tes.	Syria.	East side of Anti Libanus.	Mediterranean sea.	225
	Germany.	Elb-brunnen in Bohemia.	German ocean.	770
tes.	Asiatic Turkey.	Mountains of Armenia.	Persian gulf.	1,360
	Scotland.	East side of Ben Lomond.	German ocean.	110
.	Senegambia.	Plateau of Fouta Toro.	Atlantic ocean.	700
.	Hindostan.	Snow above Gangoutri, in the Himalaya.	Bay of Bengal.	1,350
e.	France.	Valley of Aran, in Spain.	Bay of Biscay.	400
an.	Norway.	Mountains southeast of Trondheim.	Baltic sea.	400
ry.	Hindostan.	Western Ghauts.	Bay of Bengal.	850
quiver.	Spain.	Mountains on the frontiers of Murcia and Granada.	Gulf of Cadiz.	280
na.	Spain.	Pools of Ruideva in La Mancha.	Gulf of Cadiz.	460
Ho.	China.	Koulkoun mountains.	Yellow sea.	3,000
.	United States.	Marsh near Lake Champlain.	Bay of New York.	325
r (Trent br.)	England.	Moorlands of Staffordshire.	German ocean.	230
	Hindostan.	Little Thibet, north of the Himalaya.	Arabian sea.	1,700
y.	Birman Empire.	Mountains east of Assam.	Bay of Bengal.	1,200
s, or Sihoun.	Turkestan.	Country of the Highland Kirgliz.	Sea of Aral.	1,200
river.	United States.	Allegany mountains.	Chesapeake bay.	500
	Palestine.	Mount Hermon	Dead sea.	100
h.	Hindostan	Himalaya mountains.	Ganges.	1,600
mak, the ancient Halys.	Asia Minor.	Frontiers of Sisas.	Black sea.	570
a, or Kistna.	Hindostan.	Western Ghauts.	Bay of Bengal.	650
or Sarahat, ancient Her-	Asia Minor.	Murad-tagh.	Gulf of Smyrna.	190
a.	Russian Asia.	Valley near Mount Elburz.	Black sea	480
nce, St.	Canada.	River St. Louis, E. of Lake Superior.	Atlantic ocean.	1,960
	Siberia.	Heights of Irkutsk.	Arctic ocean.	2,500
	France.	Mount Gerbier, in the Cevennes.	Bay of Biscay.	620
nsie.	North America.	River Athabasca, in the Rocky m't'ns.	Arctic ocean.	1,600
er.	Asia Minor.	West side of Central Plateau.	Archipelago.	180
lena.	South America.	Andes.	Caribbean sea.	840
ang.	Birman Empire.	Thibet.	Chinese gulf.	1,700
n.	Birman Empire.	Yunnaw.	Gulf of Siam.	850
, or Maas.	Holland.	Limburg.	German ocean.	520
ippi.	North America.	Lake Itaska.	Gulf of Mexico.	3,200
ri.	North America.	Rocky mountains.	Gulf of Mexico.	4,500
.	Australasia.	Australian Alps.	Encounter bay.	3,000
	Soudan.	Base of Mount Loma.	Gulf of Guinea.	2,300
	Egypt and Nubia.	Blue Nile in Plateau of Abyssinia; source of White Nile unknown.	Mediterranean sea.	2,750
	Siberia.	Altaian mountains.	Arctic ocean.	2,800
	Germany.	Mountains of Moravia.	Baltic sea.	460
, or Gareep.	South Africa.	Mountains N. W. of Port Natal.	Atlantic ocean.	1,050
o.	South America.	Mountains of Spanish Guiana.	Atlantic ocean.	1,150
or Jihoun	Turkestan	Siri-kol, a lake in Khandut.	Sea of Aral.	1,300
Paraguay br.	South America.	South west of Brazil.	Atlantic ocean.	2,130
	Italy.	Crottian Alps.	Adriatic sea.	500
ac.	United States.	Great Backbone mountain.	Chesapeake bay.	400
	Germany.	Rhetian Alps.	German ocean.	830
	France.	Glacier of Mount Furca.	Mediterranean sea.	540
	France.	Plateau of Langres.	British Channel.	480
al.	Africa.	Heights near Teembo.	Atlantic ocean.	950
	England.	East side of Plinlimmon.	Bristol Channel.	210
on.	Ireland.	Loch Allen.	Atlantic ocean.	220
shannah.	United States.	Lake to the south of Ontario.	Chesapeake bay.	500
	Spain and Portugal.	Mountains of New Castile.	Atlantic ocean.	520
	Russian Asia.	Foot of Mount Kasibec.	Caspian sea.	300
s.	England.	Cotswold hills.	German ocean.	240
	Italy.	East border of Tuscany.	Mediterranean sea.	210
	Turkey in Asia.	Mountains of Armenia.	Persian gulf.	920
.	Poland.	Austrian Silesia.	Baltic sea.	650
	Russia.	Lake in the forest of Volhonsky.	Caspian sea.	1,000
se-Kiang.	China.	Thibet.	Chinese sea.	2,700

THE TOMBS OF THE KINGS OF GOLCONDA.

(SEE FRONTISPIECE.)

MORNING is round the shining palace,
  Mirrored on the tide,
Where the lily lifts her chalice,
  With its gold inside,
    Like an offering from the waves.
Early wakened from their slumbers,
  Stand the glittering ranks;
Who is there shall count the numbers
  On the river's banks?
    Forth the household pours the slaves,
    Of the kings of fair Golconda,
    Of Golconda's ancient kings.

Wherefore to the crimson morning
  Are the banners spread,
Daybreak's early colors scorning
  With a livelier red?
    Pearls are wrought on each silk fold,
Summer flowers are flung to wither
  On the common way.
Is some royal bride brought hither
  With this festival array,
    To the city's mountain-hold,
    Of the kings of old Golconda,
    Of Golconda's ancient kings?

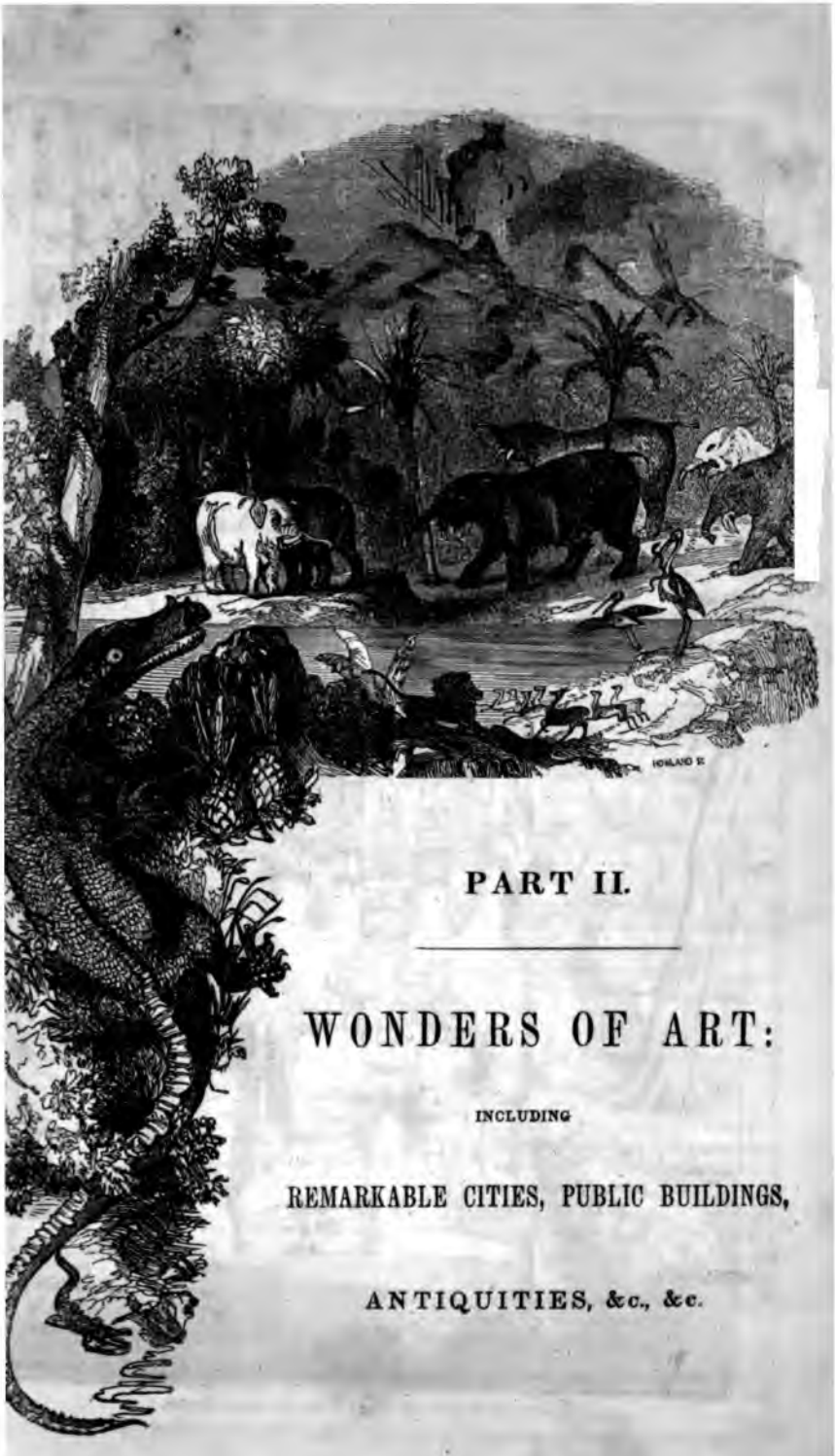
From the gates the slow procession,
  Troops and nobles come.
This hour takes the king possession
  Of an ancient home —
    One he never leaves again.
Musk, and sandal-wood, and amber,
  Fling around their breath:
They will fill the murky chamber
  Where the bride is Death! —
    Where the worm hath sole domain
    O'er the kings of old Golconda,
    O'er Golconda's ancient kings.

Now the monarch must surrender
  All his golden state,
Yet the mockeries of splendor
  On the pageant wait
    That attends him to the tomb.
Music on the air is swelling,
  'Tis the funeral song,
As to his ancestral dwelling
  Is he borne along.
    They must share life's common fate,
    The kings of fair Golconda,
    Golconda's ancient kings.

What are now the chiefs that gather?
  What their diamond mines?
What the heron's snowy feather
  On their crest that shines?
    What their valleys of the rose?
For another is their glory,
  And their state, and gold;
They are a forgotten story,
  Faint and feebly told —
    Breaking not the still repose
    Of the kings of fair Golconda,
    Of Golconda's ancient kings.

Glorious is their place of sleeping,
  Gold with azure wrought,
And embroidered silk is sweeping —
  Silk from Persia brought,
    Round the carvèd marble walls.*
Not the less the night-owl's pinion
  Stirs the dusky air,
Not the less is the dominion
  Of the earth-worm there.
    Not less deep the shadow falls
    O'er the kings of fair Golconda,
    O'er Golconda's ancient kings!

* Thevenot gives a splendid description of these tombs. In addition to their architectural decoration, they were hung with embroidered satin.



PART II.

WONDERS OF ART:

INCLUDING

REMARKABLE CITIES, PUBLIC BUILDINGS,

ANTIQUITIES, &c., &c.

the statues of Spring, Summer, Autumn, and Winter, and many observations of the moon. In the upper part of the clock are four old men's statues which strike the quarters of the hour; the statue of Death comes out at each quarter to strike, but is driven back by the statue of Christ, with a spear in his hand, for three fourths, but in the fourth quarter that of Christ goes back, and that of Death strikes the hour, with a bone in his hand, and then the chimes sound. On the top of the clock is an image of a cock, which twice in the day crows aloud, and claps his wings. Besides, this clock is decked with many rare pictures; and, being on the inside of the church, carries another frame to the outside of the walls, wherein the hours of the sun, the courses of the moon, the length of the day, and such other things, are set out with great art.

Fine Clock at Lyons.—In the magnificent cathedral dedicated to St. John, at Lyons, in France, is a most curious clock, justly celebrated for its surprising mechanism and motions. It is placed in an aisle near the choir. On the top stands a cock, which every three hours claps his wings and crows thrice. In a gallery underneath, a door opens on one side, out of which comes the Virgin Mary; and from a door on the other side the Angel Gabriel, who meets and salutes her; at the same time a door opens in the alcove part, out of which the form of a dove, representing the Holy Ghost, descends on the Virgin's head. After which they return in again, and from a door in the middle comes a figure of a reverend father, lifting up his hands and giving his benediction to the spectators. The days of the week are represented by seven figures, each of which takes its place in a niche on the morning of the day it represents, and continues there till midnight. But perhaps the greatest curiosity is an *oval* plate, marked with the minutes of the hour, which are exactly pointed to by a hand reaching the circumference, which insensibly dilates and contracts itself during its revolution. This curious clock can not be supposed to be so perfect in all its motions as it was formerly, and yet it has suffered as little as can be expected in a long course of years, through the care and skill of those appointed to look after it.

It appears by an inscription on the clock itself, that it was repaired and improved by one *Nourison*, in 1661; but it was contrived long before that time, by *Nicholas Lipp*, a native of Basil, who finished it in 1598, when he was about thirty years of age. After which, it is said, he had his eyes put out, by order of the magistrates of Lyons, that he might never be able to perform the like again. But this is so far from being true, that the magistrates engaged him to fix at Lyons, by allowing him a considerable salary to look after his own machine. The oval minute motion was invented by Mr. Servier, and is of later date.

Beautiful Clock at Lunden.—The cathedral of Lunden, in Sweden, is a magnificent structure, and has a very lofty spire, which serves as a mark for sailors, being seen at a great distance.

The altar of this church is a beautiful piece of work; but what most engages the attention of a stranger is its curious clock, which, from the number of its movements and figures, may vie with those of Lyons and Strasburgh. Every hour two horsemen come out and encounter, and a door opens which discovers the Virgin Mary sitting on a throne with her divine infant in her arms, and the Magi with their retinue marching in order, and presenting their gifts, two trumpeters sounding all the time of the procession. This clock, besides the hour, shows the month and day, and every festival throughout the year.

Clocks in the form of Chariots.—Surprising as the mechanical won-

ders just described may seem to be, they appear to be excelled by two clocks made a few years since, by an English artist, and sent as a present from the East India company to the emperor of China.

These clocks are in the form of chariots, in which are placed, in a fine attitude, a lady, leaning her right hand upon a part of the chariot; under which is a clock of curious workmanship, little larger than a shilling, that strikes, and repeats, and goes eight days. Upon her finger sits a bird finely modelled, and set with diamonds and rubies, with its wings expanded in a flying posture, and actually flutters for a considerable time on touching a diamond button below it; the body of the bird (which contains part of the wheels that in a manner give life to it) is not the bigness of a sixteenth of an inch. The lady holds in her left hand a gold tube, not much thicker than a large pin, on the top of which is a small round box, to which a circular ornament set with diamonds, not larger than a sixpence, is fixed, which goes round near three hours, in a constant regular motion. Over the lady's head, supported by a small fluted pillar, no bigger than a quill, are two umbrellas, under the largest of which a bell is fixed, at a considerable distance from the clock, and seeming to have no connexion with it, but from which a communication is secretly conveyed to a hammer that regularly strikes the hour, and repeats the same at pleasure, by touching a diamond button fixed to the clock below. At the feet of the lady is a gold dog, before which, from the point of the chariot, are two birds, fixed on spiral springs, the wings and feathers of which are set with stones of various colors, and appear as if flying away with the chariot, which, from another secret motion, is contrived to run in a straight, circular, or any other direction. A boy that lays hold of the chariot behind, seems also to push it forward. Above the umbrella are flowers and ornaments of precious stones, and it terminates with a flying dragon set in the same manner. The whole is of gold, most curiously executed, and embellished with rubies and pearls.

Curious Automatons.—It is said that Archytas of Tarentum, 400 years before Christ, made a wooden pigeon that could fly; that Archimedes also made such automatons; that Regiomontanus made a wooden eagle that flew forth from the city, met the emperor, saluted him, and returned; also, that he made an iron fly, which flew out of his hand at a feast, and returned again after flying about the room. That Dr. Hook made the model of a flying chariot, capable of supporting itself in the air. Many other automatons have been exhibited in the present age, some of which we shall describe. Some figures have been formed that could write, and perform many actions in imitation of animals. M. Vaucanson made a figure that played on the flute; the same gentleman also made a duck which was capable of eating, drinking, and imitating exactly the voice of a natural one; and, what is still more surprising, the food it swallowed was evacuated in a digestive state, or considerably altered in the principles of solution; also the wings, viscera, and bones, were formed so as strongly to resemble those of a living duck; and the actions of eating and drinking showed the strongest resemblance, even to the muddling the water with its bill. This has been extensively exhibited in America.

M. Le Droz, of La Chaux de Fronds, in the province of Neufchatel, has also executed some very curious pieces of mechanism; one was a clock, presented to the king of Spain, which had, among other curiosities, a sheep that imitated the bleating of a natural one, and a dog watching a basket of fruit, that barked and snarled when any one offered to take it away; besides a variety of human figures, exhibiting motions truly surprising.

Another automaton of Droz's was the figure of a man, about the natural

size, which held in the hand a metal style, and, by touching a spring that released the internal clock-work from its stop, the figure began to draw on a card; and, having finished its drawings on the first card, the figure rested, and then proceeded to draw different subjects on five or six other cards. The first card exhibited elegant portraits of the king and queen, facing each other; and the figure was observed to lift its pencil with the greatest precision, in the transition from one point to another, without making the least slur.

Automaton Chess-player.—This astonishing piece of mechanism was the invention of Wolfgang de Kempelin, a Hungarian gentlemen, and aulic counsellor to the royal chamber of the domains of the emperor in Hungary in 1769.

The room where it is exhibited has an inner apartment, in which appears the figure of a Turk, as large as life, dressed after the Turkish fashion, sitting behind a chest of three feet and a half in length, two feet in breadth, and two feet and a half in height, to which it is attached by the wooden seat on which it sits. The chest is placed upon four castors, and, together with the figure, may be easily moved to any part of the room. On the plain surface, formed by the top of the chest, in the centre, is raised an immovable chess-board of handsome dimensions, upon which the figure has its eyes fixed; its right arm and hand being extended on the chest, and its left arm somewhat raised, as if in the attitude of holding a Turkish pipe, which originally was placed in its hands.

The exhibitor begins by wheeling the chest to the entrance of the apartment within which it stands, and in face of the spectators. He then opens certain doors contrived in the chest, two in front, and two at the back, at the same time pulling out a long shallow drawer at the bottom of the chest, made to contain the chess-men, a cushion for the arm of the figure to rest upon, and some counters. Two lesser doors, and a green cloth screen, contrived in the body of the figure and its lower parts, are likewise opened, and the Turkish robe which covers them is raised; so that the construction both of the figure and chest internally is displayed. In this state the automaton is moved round for the examination of the spectators; and to banish all suspicion from the most skeptical mind, that any living subject is concealed within any part of it, the exhibitor introduces a lighted candle into the body of the chest and figure, by which the interior of each is, in a great measure, rendered transparent, and the most secret corner is shown. Here it may be observed, that the same precaution to remove suspicion is used, if requested, at the close as at the commencement of a game of chess with the automaton.

The chest is divided by a partition into two unequal chambers. That to the right of the figure is the narrowest, and occupies scarcely one third of the body of the chest. It is filled with little wheels, levers, cylinders, and other machinery, used in clockwork. That to the left contains a few wheels, some small barrels with springs, and two quarters of a circle placed horizontally. The body and lower parts of the figure contain tubes, which seem to be conductors to the machinery. After a sufficient time, during which each spectator may satisfy his scruples and his curiosity, the exhibitor recloses the doors of the chest and figure, and the drawer at bottom, makes some arrangements in the body of the figure, winds up the works with a key inserted into a small opening on the side of the chest, places a cushion under the left arm of the figure, which now rests upon it, and invites any individual present to play a game of chess.

In playing a game the automaton makes choice of the white pieces, and always has the first move. These are small advantages toward winning the

game, which are cheerfully conceded. It plays with the left hand, the right arm and hand being constantly extended on the chest, behind which it is seated. This slight incongruity proceeded from absence of mind in the inventor, who did not perceive his mistake till the machinery of the automaton was too far completed to admit of the mistake being rectified. At the commencement of a game, the automaton moves its head, as if taking a view of the board; the same motion occurs at the close of a game. In making a move, it slowly raises its left arm from the cushion placed under it, and directs it toward the square of the piece to be moved, its hand and fingers open on touching the piece, which it takes up and conveys to any proposed square. The arm then returns with a natural motion to the cushion, upon which it usually rests. In taking a piece, the automaton makes the same motions of the arm and hand to lay hold of the piece, which it conveys from the board; and then returning to its own piece, it takes it up and places it on the vacant square. These motions are performed with perfect correctness; and the dexterity with which the arm acts, especially in the difficult operation of castling, seems to be the result of spontaneous feeling, bending of the shoulder, elbow, and knuckles, and cautiously avoiding to touch any other piece than that which is to be moved, nor ever making a false move.

After a move made by its antagonist, the automaton remains for a few moments only inactive, as if meditating its next move; upon which the motions of the left arm and hand follow. On giving check to the king, it moves its head as a signal. When a false move is made by its antagonist, which frequently occurs through curiosity, to observe in what manner the automaton will act (as, for instance, if a knight be made to move like a castle), the automaton taps impatiently on the chest with its right hand, replaces the knight on its former square, and, not permitting its antagonist to recover his move, proceeds immediately to move one of its own pieces; thus appearing to punish him for his inattention. The little advantage in play which is hereby gained, makes the automaton more than a match for its antagonist, and seems to have been contemplated by the inventor as an additional resource toward winning the game.

It is important that the person matched against the automaton should be attentive in moving a piece, to place it precisely in the centre of the square, otherwise the figure, in attempting to lay hold of the piece, may miss its hold, or even sustain some injury in the delicate mechanism of the fingers. When the person has made a move, no alteration in it can take place; and if a piece be touched it must be played somewhere. This rule is strictly observed by the automaton. If its antagonist hesitate to move for a considerable time, it taps smartly on the top of the chest with the right hand, which is constantly extended upon it, as if testifying impatience at his delay.

During the time that the automaton is in motion, a low sound of clockwork running down is heard, which ceases soon after its arm returns to the cushion; and then its antagonist may make his move. The works are wound up at intervals, after ten or twelve moves, by the exhibitor, who is usually employed in walking up and down the apartment in which the automaton is shown; approaching, however, the chest from time to time, especially on its right side.

Automaton Musicians.—One of the most celebrated modern constructors of androides was M. Vaucanson, before referred to, of the Académie Royal. In 1738, he exhibited at Paris a machine capable of playing several airs on the German flute, of which he, in the same year, communicated an exact description and explanation to the academy, containing much curious information respecting the theory, as well as the practice, of that musical instrument.

This machine was a figure about five feet and a half in height, situated on the fragment of a rock, fixed upon a square pedestal four feet and a half high, by three and a half broad. The front of the pedestal being opened, a clock-work movement was seen, by means of which a steel axis was made to revolve, having various protuberances upon it, to which were attached cords thrown over pulleys, and terminating in the upper boards of nine pairs of bellows, which were thus alternately raised and let down by the revolution of the axis. The disagreeable fluttering noise produced by the wind forcing upon the valves of the bellows, was prevented by causing the valves to open by means of levers, which were acted upon by the tightening of the ropes which raised the upper boards of the bellows, and which, therefore, kept the valve open till the boards were allowed to descend. The nine pairs of bellows discharged their air into three different tubes, which, ascending through the body of the figure, terminated in three small reservoirs in its trunk; these they united into one, which, ascending to the throat, formed the cavity of the mouth. To each of the three pipes three pairs of bellows were attached. The upper boards of one set were pressed down with a weight of four pounds, those of the second set by a weight of two pounds, and those of the third by their own weight only.

Such were the expedients for supplying air to the flute-player; another piece of clock-work contained within the pedestal was for the purpose of communicating the proper motions to his fingers, his lips, and his tongue. By this movement a cylinder was made to revolve, two feet and a half long, and sixty-four inches in circumference, which was divided into fifteen equal parts, of an inch and a half each. In these divisions were inserted various pegs and staples of brass, which raised and depressed the ends of fifteen different levers, similar to those which produce the sounds of a common barrel organ. Seven of these levers regulated the motions of the seven fingers required to stop the holes of a German flute, with which they communicated by means of steel chains ascending through the body of the figure, and directed by means of pulleys into the proper angles at the shoulder, elbow, &c. Three of the levers regulated the ingress of the air, being connected with the valves of the three reservoirs in the body of the figure, which they opened and shut at pleasure, so as to produce a stronger or weaker, a louder or lower tone. By a similar contrivance, four of the levers served to give the proper motions to the lips, so as to allow a freer passage to the air; another contracted them, so as to diminish the efflux of air; the third drew them backward from the orifice of the flute, and the fourth pushed them forward. The remaining lever was employed in the direction of the tongue, to which it gave motion, in such a manner as to open and shut the mouth of the flute at pleasure. This mechanism, with other ingenious contrivances, enabled M. Vaucanson to produce all the motions requisite for an expert player on the flute, and which he executed in such a manner as to produce music equal in beauty to that derived from the exertions of a well-practised living performer. The same gentleman afterward exercised his ingenuity in the construction of another musical androides, exhibited to the academy in 1741, and which was not less admired than his flute-player. This was a mechanical performer on the pipe and tabor, fixed, like the flute-player, on a pedestal, habited like a dancing shepherd, and capable of playing about twenty airs, consisting of minuets, rigadoons, and country dances.

Automaton seated at a Pianoforte.—Among the most celebrated automatical mechanics of the present day, is M. Maillardet, a native of Switzerland, who has constructed several androides of unrivalled excellence. One of these represents a beautiful female seated at a pianoforte, on which she

performs eighteen tunes. Independent of the expression of the music which is produced by the actual pressure of her fingers on the keys, all her motions are elegant and graceful, and so nearly imitating life, that, even on a near approach, the deception can hardly be discovered. Before commencing a tune, she makes a gentle inclination with her head, as if saluting the auditors; and remains seemingly intent on the performance. Her bosom heaves, her eyes move, and appear as naturally to follow her fingers over the keys, as if it were real animation. The hands regulate the natural tones only, for the flats and sharps are played by pedals, on which the feet operate. It is likewise, to be observed, that although the instrument resembles a pianoforte, it is, in fact, an organ, the bellows of which are blown by particular parts of the machinery. The movements of this figure are effected by means of six large springs, which, when completely wound up, will preserve their action during an hour. The various parts composing the machinery are extremely nice and complicated, and all admirably adapted to the purposes required. Twenty-five leaders, or communications, produce the different motions of the body, and others, proceeding from the centre of motion, are distributed to the different parts of the instrument. A brass fly regulates and equalizes the whole. The figure is so contrived for the convenience of removal, that it divides in the middle. It is enclosed in a large glass case, and rests above a mahogany box containing the machinery, which the artist throws open for universal inspection. It was valued by him at from ten to twelve thousand dollars, which may in some respect prove the extent of the labor and ingenuity in framing it.

Automaton Tarantula Spider.—This singular automaton comes independently out of a box, and runs backward and forward on a table; stretches out and draws in its paws, as if at will; moves its horns and claws, and opens them with ease.

This wonderful little figure must fix the attention of the curious, having no other power of action than the mechanism contained in its body. The thing might have been thought impossible, on account of its smallness, and the difficulty of putting together, it being composed of *one hundred and fifteen* different pieces.

Automaton Opera.—Toward the end of the seventeenth century, Father Truchet of the Royal Academy of Sciences, constructed for the amusement of Louis XIV., an automaton, consisting of a kind of moving pictures, which was considered as a masterpiece in mechanics. One of these pictures, which the monarch called his *little opera*, represented an opera in five acts, and changed the decorations at the commencement of each. The actors performed their parts in pantomime. This moving picture was only sixteen inches in breadth, thirteen inches four lines in height, and one inch three lines in thickness for the play of the machinery. The representation could be stopped at pleasure, and made to recommence at the same place by the operation of a catch.

Automaton Coach and Horses.—A more extraordinary piece of mechanism than the foregoing, is that described by M. Camus, who says he constructed it for the amusement of Louis XIV., when a child. It consisted of a small coach drawn by two horses, in which was the figure of a lady, with a footman and page behind. According to the account given by M. Camus himself, this coach being placed at the extremity of a table of a determinate size, the coachman smacked his whip, and the horses immediately set out, moving their legs in a natural manner. When the carriage reached the edge of the table, it turned at a right angle, and proceeded along that edge. When it arrived opposite to the place where the king was seated, it stopped, and

the page getting down, opened the door, upon which the lady alighted, having in her hand a petition, which she presented with a courtesy. After waiting some time, she again courtesied, and re-entered the carriage; the page then resumed his place, the coachman whipped his horses, which began to move, and the footman, running after the carriage, jumped up behind it, and the carriage drove on.

Writing Automaton.—M. Maillardet constructed a writing boy, who is exhibited kneeling on one knee, an attendant having dipped his pencil, and laid the paper before him, he executes drawings, and French and English sentences, in writing of a very superior description. Every natural motion of the fingers, elbow, eyes, &c., is correctly imitated. The first of these figures, the artist stated to have cost the sum of $8,000 in its construction.

Automaton Singing-Bird.—M. Maillardet, an artist whom we have before mentioned, constructed an oval box, about three inches in length; the lid flew up, and a bird of beautiful plumage not larger than a small humming-bird, started up from its nest. Its wings fluttered, and its bill opening with a tremulous vibration peculiar to singing-birds, it began to warble. After continuing a succession of notes, which would fill a large apartment, it darted down into its nest, and the lid closed of itself. The machinery was here contained in a very narrow compass, and could produce four different kinds of warbling: it was put in motion by springs, which preserved their action during four minutes. It has often created great surprise how such a variety of notes could be produced within a space where there was evidently no room for a corresponding number of pipes. The artist, however, has accomplished his purpose, by a very simple expedient. There is only one tube, the vacuity of which is shortened or lengthened by a piston working inside, and thus producing sounds graver or more acute, according as the machinery operates upon it.

Mechanical Theatre.—The spectacle in the *Picturesque and Mechanical Theatre*, consisted of scenery and appropriate little moving figures. The first scene was a view of a wood in early morning; every object looked blue, fresh, and dewy. The gradations of light, until the approach of meridian day, were admirably represented, Serpents were seen crawling in the grass. A little sportsman entered with his fowling-piece, and imitated all the movements natural to his pursuit; a tiny wild duck rose from a lake, and flew before him. He pointed his gun, and changed his situation, pointed again, and fired: the bird dropped; he threw it over his shoulders, fastened his gun, and retired. Wagons, drawn by horses four inches high, passed along; groups of peasantry followed, exquisitely imitating all the indications of life. Among several other scenes was a beautiful view of the bay of Naples, and the great bridge, over which little horses with their riders passed in the various paces of walking, trotting, and galloping. All the minutiæ of nature were attended to. The ear was beguiled with the patting of the horses' hoofs upon the pavement; and some of the little animals reared, and ran before the others. There were, also, some charming little sea-pieces, in which the vessels sailed with their heads toward the spectators, and manœuvred in a surprising manner. The whole concluded with a storm, and shipwrecked sailors were seen floating in the water, then buried in the surge. One of them rose again and reached a rock. Boats put off to his relief, and perished in the attempt. The little figure was seen displaying the greatest agonies. The storm subsided: tiny persons appeared upon the top of a cliff, and lowered a rope to the little sufferer, which he caught, and after ascending to some height by it, lost his hold. Recovering from the fall, he renewed his efforts, and at length reached the top in safety.

SUBJECT XII.

PRINCIPAL CITIES.

ORWAY claims the admiration of the lover of nature in its grandest forms, and its political, social, and moral condition, suggests many instructive reflections to the political economist and the philosopher; and yet this interesting country seldom attracts our tourists, who prefer the beaten track which leads them to the great capitals of Europe.

It is not owing to want of energy or industry that Norway is the most thinly peopled country in Europe, but because one third of it consists of bare rocks or water, and the surface suitable for cultivation is of small extent. From fifty-eight degrees to seventy-one degrees of latitude, the western ry of Norway consists of an immense line of rugged coast, penetrated ımerable fiords or harbors, from twelve to two hundred miles long, many places not more than three or four in width. These fiords are scribed as great lateral valleys filled with the sea. They abound in e never frozen, and those of the largest size could shelter all the navies world. The people who inhabited this coast, were the first in north-rope to whom the ocean became a familiar element. The peculiari-a high northern climate are not unfavorable to a high degree of vege-ower, and as far north as sixty-five degrees, crops of bear, oats, and of red wheat, with hops, hemp, and flax, are abundant; and cherries n the open air, while in the northern parts of Scotland, eight degrees ard, this fruit does not attain maturity. The heat of summer is very and as the sun is above the horizon for so many hours, the nights are l warm, and delightful to the senses. In winter the air is dry and , and not damp and clammy.

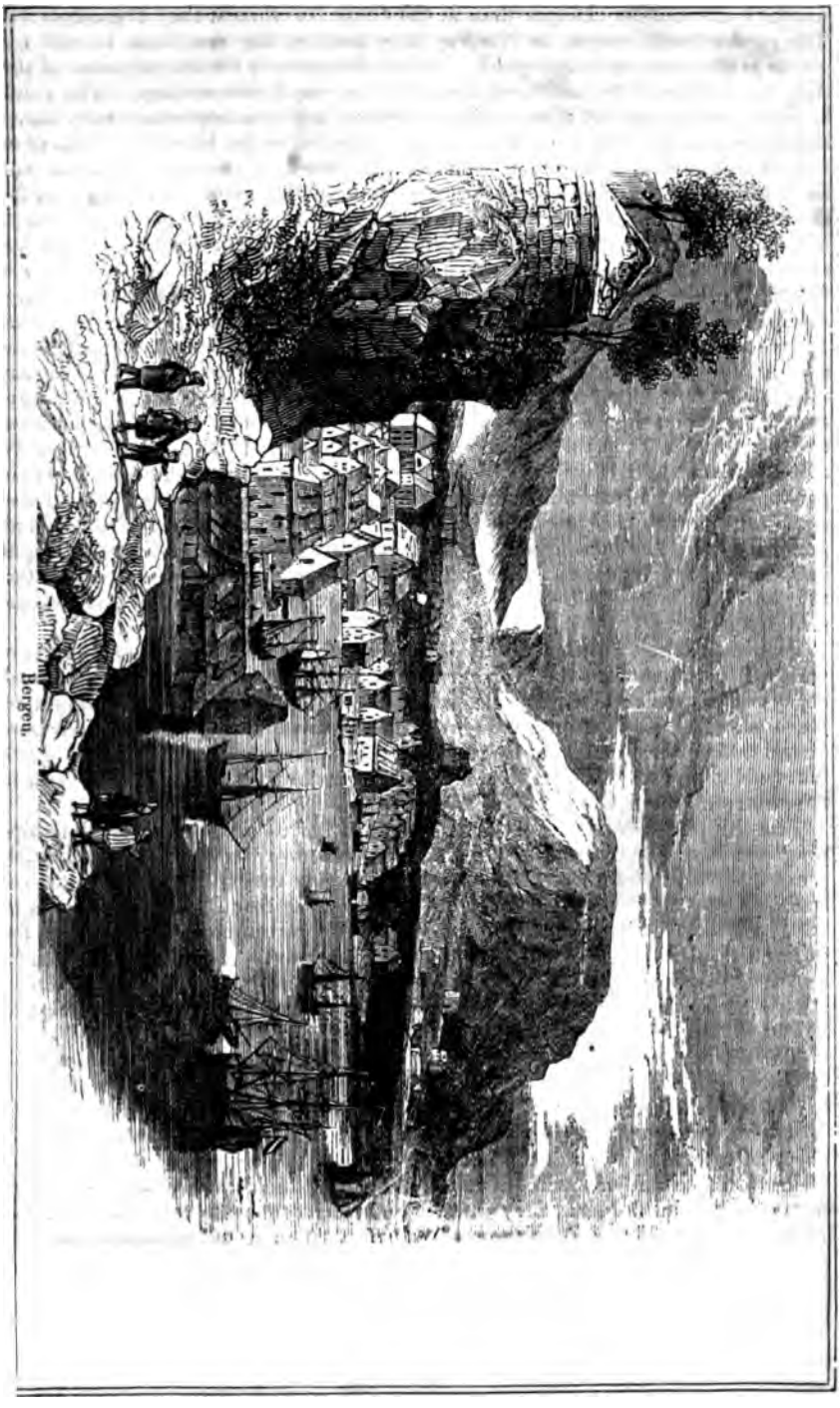
e happiness of a nation depends, more than any other cause, upon the n which property is distributed, then, as that of Norway differs from European countries, its influence upon the well-being of the people is ng of peculiar consideration. In France, the equal partition of prop-nong children has been a principle too recently adopted to have pro-much effect, while in every other country, the feudal law of primo-e entirely prevails. In Norway, land never was the property of a nd it belongs to the great body of the people. While the number of s possessing land in Ireland is only about one in one thousand, and in

Scotland one in about seven or eight hundred; the proportion of persons in Norway possessing a freehold estate, is one in twenty-two. This was the state of things centuries ago, when the peasantry of the rest of Europe were in a state of villanage. The land was always held without any tenures of military service, or other conditions imposed by a superior upon his vassal tenants: it was proudly held "by the same right by which the crown is held." In France, Germany, and England, the feudal baron trampled with impunity upon the rights of his inferior dependants, sanctioned in his abuse of power by law and custom; and a remedy was not provided until the rise of a class who acquired wealth and consideration in trade, and who were interested in promoting more liberal ideas respecting personal rights.

After ten centuries of division and subdivision, the economical state of the country, its institutions, and the habits and manners of the people, are all based upon the peculiar arrangements which affect property in land. There is considerable equality of fortunes, but no blending of ranks, which are as distinctly defined as in other old countries. The tone of manners is elevated, not deteriorated. The sense of honor is acute. "The Norwegian peasant," says Mr. Laing, "in real high-mindedness, is the Spaniard of the north." Feelings of self-respect, and consideration for others pervade all ranks. The ancient laws are simple and well-defined; justice is accessible; the judges are amenable to a supreme court, and their sentences are liable to be called in question. Political liberty is warmly cherished; and the people have the making of the laws almost entirely in their own hands. These circumstances indicate an identity of interests which binds all classes into something like a family union.

The arts, as might be expected, are not carried to much perfection in Norway. Only one eleventh of the population reside in towns, and the remainder provide themselves with all the necessaries of life, fuel, lodging, clothing, fish, meat, grain, dairy produce, and fermented and distilled liquors, without having recourse to money or even to barter. The agricultural laborers occupy land on the estates of their employers, and consequently the money-wages which they receive are very low. The Norwegian farmer, it is remarked, can afford to farm worse by one third than a tenant-farmer, who has to turn nearly the whole produce which he raises into money. We see, by the example of Norway, how the hospitality for which old times were so famous, could be indulged in without ruin, by a family raising more than was necessary for its own consumption, while purchasers could scarcely be found for the surplus. Instead of the extraordinary wealth which exists in a country where the highest stimulus that capital and machinery can apply to valuable native resources is everywhere in active operation, the Norwegians can obtain only an abundant supply of clothing and food. This the land gives them, but nothing beyond this; and few are in the enjoyment of the ease, luxuries, and refinements, which are so extensively diffused in an opposite state of society. There are few opportunities for individuals rising in the world; the competition for wealth, accompanied by the excitement and feverish struggles for success, which attend its pursuit elsewhere, is unknown.

The direct taxes in Norway being heavy, the duties on imported commodities are light. The import-duties seldom exceed two per cent. *ad valorem*. French wines are cheaper than in most towns in France, where the municipal entrance-dues raise the price; the sea is an easier pathway than badly-kept roads, while the return freight by Norwegian vessels engaged in conveying timber to France is a mere trifle. From other countries, to which Norway sends timber or fish, the freight of goods is remarkably low. Coffee, sugar, tea, and manufactured goods, from the British, Hamburgh, and Dutch



Bergen.

markets, are usually cheaper than in the countries whence they are exported. The customhouse system in Norway also enables the merchant to sell his goods at the most moderate price. On giving security for the payment of the duty, he is allowed to take them at once to his warehouse or shop. The stock is taken at the time by a customhouse officer, and it is inspected every three months, when the duty is paid on all sales effected in the interval. This plan is very economical and advantageous to consumers. The same praise can not be extended to the privileged system of trade, which gives a monopoly to individuals, allowing none but them to buy or sell in their respective districts. This is a relic of the Hanseatic system of trade. The merchants of the Hanse towns obtained privileges at Bergen so early as 1278, and in 1435 they had a factory there. The persons of whom it consisted lived in a kind of military discipline, and were not allowed to marry. Passing through the ranks as apprentices, journeymen, overseers, and factors, every servant had an ultimate prospect of becoming a partner. The servants of the association belonging to the factory at Bergen frequently behaved with great insolence to the citizens, and at one time fortified their quarter of the town, which commanded the harbor. In 1455 they murdered the governor and the bishop, with sixty other persons, and it was not till 1560 that some limits were put to their privileges, and their turbulent spirit was restrained. In the early part of the sixteenth century the company at Bergen consisted of twenty-six hundred persons. The Lofoden fisheries rendered Bergen one of the four principal *comptoirs* of the Hanseatic association. On the decline of the association, the towns in which they had established their comptoirs succeeded to their exclusive privileges.

Bergen, though not the capital, is the principal commercial town in Norway. It is situated on the Northern ocean, in latitude sixty-two degrees, and enjoys an extensive foreign trade, which is, however, principally confined to Europe. The population exceeds twenty thousand. In 1829, Bergen possessed 205 vessels, navigated by 700 men. In the same year, 622 vessels (237 Norwegian and 385 foreign) cleared inward at the customhouse. Bergen is the centre of the fish-trade of Norway.

The shipping-interest of Norway is making rapid progress. Of the shipping employed between Great Britain and Norway which entered British ports in 1820, one third was British, a proportion which has since been reduced to one tenth. The number of ships clearing from Norwegian ports in 1831 was 5,475, averaging 80 tons each. Of this number, 970 cleared for ports in the United Kingdom; and for other countries as follows: Denmark, 2,076; Holland, Bremen, Hanover, and Oldenburg, 823; Sweden, 546; France, 423; Russia, 133; other Baltic ports, 240; Hamburgh and Altona, 114; Spain, Portugal, and the Mediterranean, 130.

The distinct existence of Norway as a nation is guarantied by England. Norway enjoys a constitution of its own, and is in fact "a democracy federally united with the monarchy of Sweden." For four centuries it was united with Denmark, but in consideration of Sweden joining the alliance against France, she was rewarded by the transfer to her sceptre of a million of people, whose wishes on the subject were never consulted. The Norwegians have their own commercial flag, but they can not enter into separate relations with foreign countries. They keep themselves and all their establishments perfectly distinct from Sweden, and passengers' baggage from the sister country is examined with as much jealousy as if it came from a foreign country.

Hamburgh is the largest city in Germany, after Vienna and Berlin, but its importance is not derived from either imperial or royal influence, and to its commerce alone is it indebted for its pre-eminence. It is the great commer-

cial emporium of the north of Europe, and the most extensive dépôt for English goods on the continent. Its site on the banks of the Elbe, about eighty miles distant from the sea, was selected by Charlemagne, during his contests with the pagans of the north, for the foundation of a town; and if its situation as a defensive outpost proved advantageous, it is still better calculated in more peaceful times for the seat of commerce and a grand mart for northern and eastern Germany. On the extinction of the dynasty of Charlemagne Hamburgh had to maintain a long struggle with the dukes of Saxony, and afterward with the counts of Holstein. At length it freed itself from feudal shackles, and as one of the principal members of that great confederation of the middle ages, known under the name of the Hanseatic League, it both secured and maintained its independence. Long after the League had lost its ascendency, Hamburgh was recognised and confirmed in its rights as one of the free cities of the German empire. On Germany being overrun by the French, Hamburgh was incorporated with the French empire, and in 1810 became the capital of the department of the Mouths of the Elbe. The period of the French domination was most disastrous to the commerce of Hamburgh, but peace brought with it a return of prosperity. Under the treaties of 1815 Hamburgh was admitted a member of the German confederation, and has one vote in the deliberations of the diet which represents that body, but in the select council one vote only is allowed to Hamburgh and the other free towns of Lubeck, Bremen, and Frankfort. The free territory of Hamburgh contains an area of one hundred and fifty square miles, being exactly the size of the small county of Rutland, in England. On the south Hamburgh is bounded by the Elbe, which separates it from Hanover; on the north and west by the dutchy of Holstein, and on the east by the dutchy of Lauenburgh, both belonging to Denmark. The thriving town of Altona, containing about thirty thousand inhabitants, is in the territory of Denmark, and not more than two miles from the gates of Hamburgh.

The population of the city of Hamburgh exceeds one hundred and twenty thousand; and with that of the territory annexed to it, amounts to about one hundred and thirty thousand. The great majority are Lutherans, and Calvinists are excluded from the government of the city; while at the free town of Lubeck, where there is a majority of Calvinists, Lutherans are excluded. The Jews at Hamburgh amount to several thousands. At the exchange, during the hours of business, may be seen natives of every European and many transatlantic countries. A fee of fifty dollars entitles foreigners to all the commercial privileges enjoyed by natives. There are two classes of citizens, one of which consists of individuals who can not either import or export goods wholesale in their own names, nor transact business at the exchange, but the distinction is scarcely an impediment to trade, and may be regarded simply as a poll-tax, as all classes of traders are obliged to take out a license. The wholesale merchant pays one hundred and fifty marks (the mark is equal to about thirty cents) for his license, and the retail trader forty.

The municipal constitution of Hamburgh apportions power to the various classes of citizens with a considerable degree of fairness. The senate, consisting of four burgomasters and twenty-four senators, with four syndics and four secretaries, is in possession of the executive power, and has the sole right of proposing laws, but laws can neither be made nor taxes imposed without the consent of the citizens in common-hall assembled. Hamburgh enjoys the benefit of a cheap and expeditious court for settling mercantile disputes. It meets twice a week, and consists of two chambers, there being an appeal from the lower to the upper chamber, the decision of the latter being final. Matters relating to trade, shipping, or manufactures, which require arbitration

and settlement, are decided upon according to the dictates of common sense enlightened by extensive mercantile experience. The president, vice-president, and actuary, are lawyers, and the remaining members are gentlemen connected with trade. The litigants usually state their case in person. The law of bankruptcy at Hamburgh, so far from impeding speculation in trade, has rather a contrary effect; and the number of private arrangements of debts in a year greatly exceeds the public declarations of insolvency, and comparatively little discredit ordinarily attaches to this form of terminating real or fictitious embarrassments. Insolvents who make a declaration of bankruptcy are classed according to the law in three divisions, namely, either as unfortunate, or careless, or fraudulent. In consequence of the extensive business speculations into which the nature of the trade of Hamburgh induces mercantile men to enter, reverses of fortune are frequent among this class; but there is not anywhere on the continent a finer field for talents and intelligence in commercial matters than Hamburgh.

Scarcely any of the public buildings are calculated to attract the attention of the architect. The Borsenhalle or exchange is one of the finest edifices, and the principal church is remarkable for the height of its tower, which exceeds by fifty feet that of St. Paul's cathedral, London. Strangers and foreigners generally find the exchange one of the principal points of attraction. Here the merchants, bankers, brokers, ship-owners, and mercantile classes, resort daily; and the busy hum of a multitude, many of them speaking in different languages, renders a scene on 'change one of great bustle and animation. There are above a thousand subcribers to the exchange, who each pay sixty marks a year. A news-room and commercial library are connected with the establishment; and under the same roof are a dancing and concert room, several rooms for billiards, a coffeehouse, and a printing-office. The ramparts of the city have been levelled, and a promenade and public garden have been formed on their site, thus forming a most agreeable place of recreation for the inhabitants. This promenade is continued all round the city, passing along the west side of the Alster river. On the north side of Hamburgh the Alster forms a fine basin, chiefly used for parties of pleasure.

The trade of Hamburgh comprises every article which the inhabitants of the greater part of Germany either produce or consume. The exports consist of linens, an article of great importance in the Hamburgh trade; grain (Hamburgh being only second in importance to Dantzic); leather, flax, copper, iron, smalts, spelter, rags, wool, woollen cloths, staves, wooden clocks, toys, Rhenish wines, &c. The chief imports are sugar; coffee, a favorite article with speculators; cotton wool, stuffs, and yarn, tobacco, hides, indigo, brandy, rum, wines, rice, dye-stuffs, pepper, tea, &c.

The large scale on which coffee and sugar are imported, and the subsequent distribution of these articles, would alone suffice to maintain an extensive maritime and inland commerce. In the number and tonnage of the vessels which enter the port, Hamburgh is second only to London and Liverpool, and considerably more than one third of the ships which annually arrive are British. The number of vessels belonging to Hamburgh is about 120, averaging about 200 tons. They are chiefly employed in the transatlantic trade.

The accommodation for shipping is good. Hamburgh is in fact situated on three navigable rivers, the Elbe and two small affluents, the Alster and the Bille. An arm of the Elbe enters the city from the east, and is there divided into a number of canals, which take various directions till they unite and join the Alster in the southern part of the city, where they form a deep harbor, which communicates with the main branch of the river. Here a large space

Hamburgh, from the Elbe.

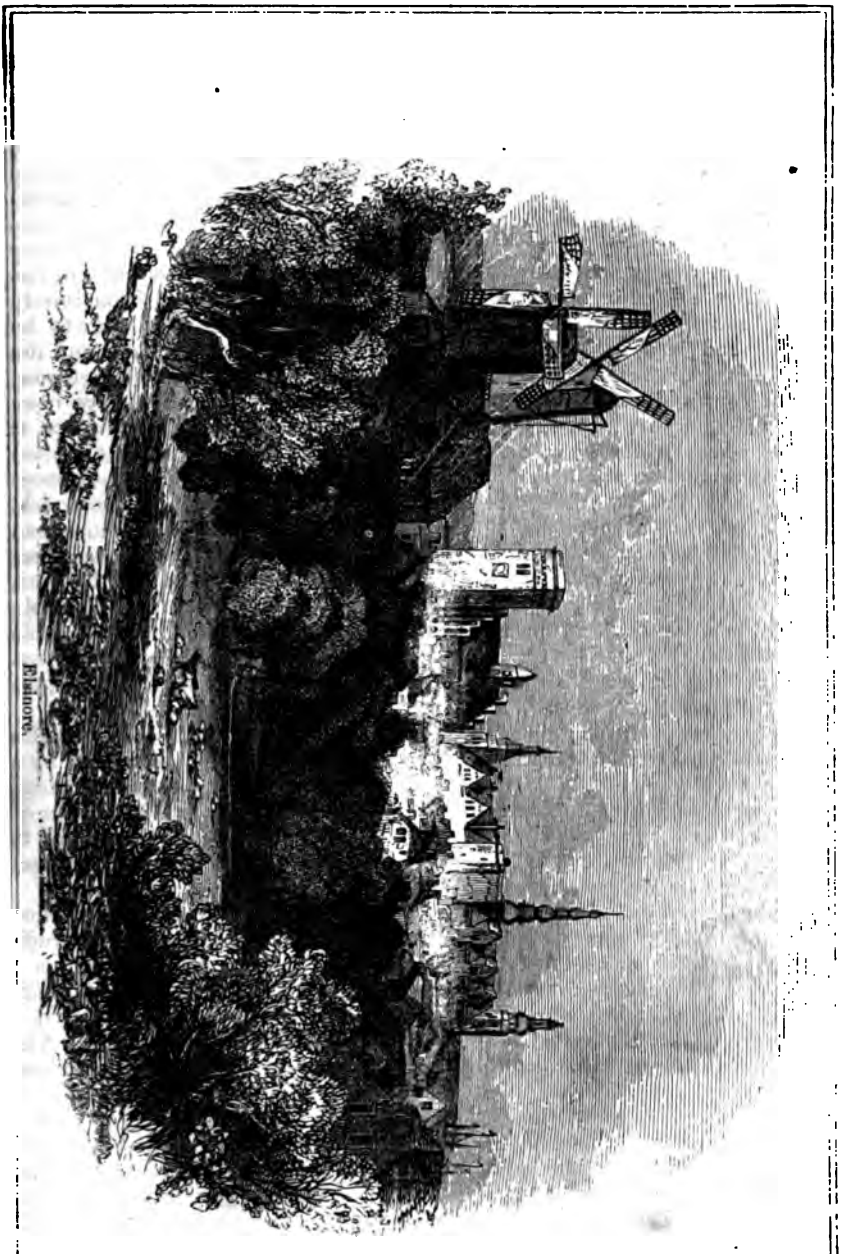
is enclosed by strong piles, where ships may lie in safety. The arm of the Elbe next the city is narrow, but this mooring-place is capable of containing a large number of vessels. Being intersected by numerous canals, which admit of barges unloading at the warehouses, Hamburgh has something of the appearance of a Dutch town.

If it were not for the great inland sea called the Baltic, which intersects Denmark, Sweden, Prussia, and Russia, these countries would be almost shut out from commercial intercouse with the rest of the world. The timber, grain, hides, tallow, hemp and flax, tar, and metals, which they produce in great abundance, and of excellent quality, and now exchange for the produce of other countries and climates, could not be rendered instrumental to so great an extent in diffusing comforts and enjoyments among the inhabitants of these bleak regions. The cost of bringing their produce to the coasts of the northern ocean would be so great, that other countries which are more accessible would be resorted to for these communities. In consequence, however, of the nature of their physical geography, the countries on the shores of the Baltic sea are more frequented by shipping than any other part of the ocean, if we except the British channel. The principal Baltic ports are Dantzic, Königsberg, Memel, Mitau, Riga, Revel, Cronstadt, Stockholm, Copenhagen, Rostock, Lubeck, Stralsund, Svinemunde, Rugen, Stettin, and many others. These places are the entrepôts for vast districts, the inhabitants of which send their raw material or natural produce to them for exportation, and receive in return the various commodities of which they stand in need, or are enabled by their industry to command. The Baltic receives the drainings of more than one fifth of Europe, and the ports on its shores are connected with at least this extent of country.

After passing a part of the sea called the "Skager Rack," which bends to the northeast between Jutland (a province of continental Denmark) and the southern coast of Norway, the Kattegat, between Jutland and the Swedish coast, turns in an opposite direction to the southeast for about one hundred and twenty miles, when it encounters the Danish islands of Zealand, Funen, and others of smaller extent, which stretch across the channel, leaving only three narrow entrances to the Baltic sea. These are the Little Belt, the Great Belt, and the Ore Sund, or the Sound, which may be called the gates of the Baltic. The two former are but little frequented by foreign vessels; and out of 2,062 vessels which passed in one year, all, excepting 178, were Danish. The Little Belt is still less frequented; and the navigation of both these channels is tedious and not without danger. The great pathway to the Baltic is therefore by the "Sound," and nearly fourteen thousand vessels pass every year in going and returning. But as the navigation of the Baltic is closed by ice for at least one third of the year, and the active part of the season for shipping is comprised within a period of six months, the Sound necessarily presents an extraordinary and highly-interesting spectacle during the summer months.

There is a fourth entrance to the Baltic by the Holstein or Kiel canal, by which vessels drawing not more than nine feet water may proceed from the German ocean to the Baltic, without going round Jutland and through the Sound. This canal is twenty-three miles in length, one hundred feet broad at the surface, fifty-four feet broad at the bottom, and ten feet deep, and was constructed between the years 1777 and 1784, at an expense of two and a half millions of dollars.

The Baltic sea covers a surface of one hundred and sixty thousand square miles. The small degree of saltness in its waters is occasioned by the absence of tides, and by the extent and number of the rivers which empty themselves



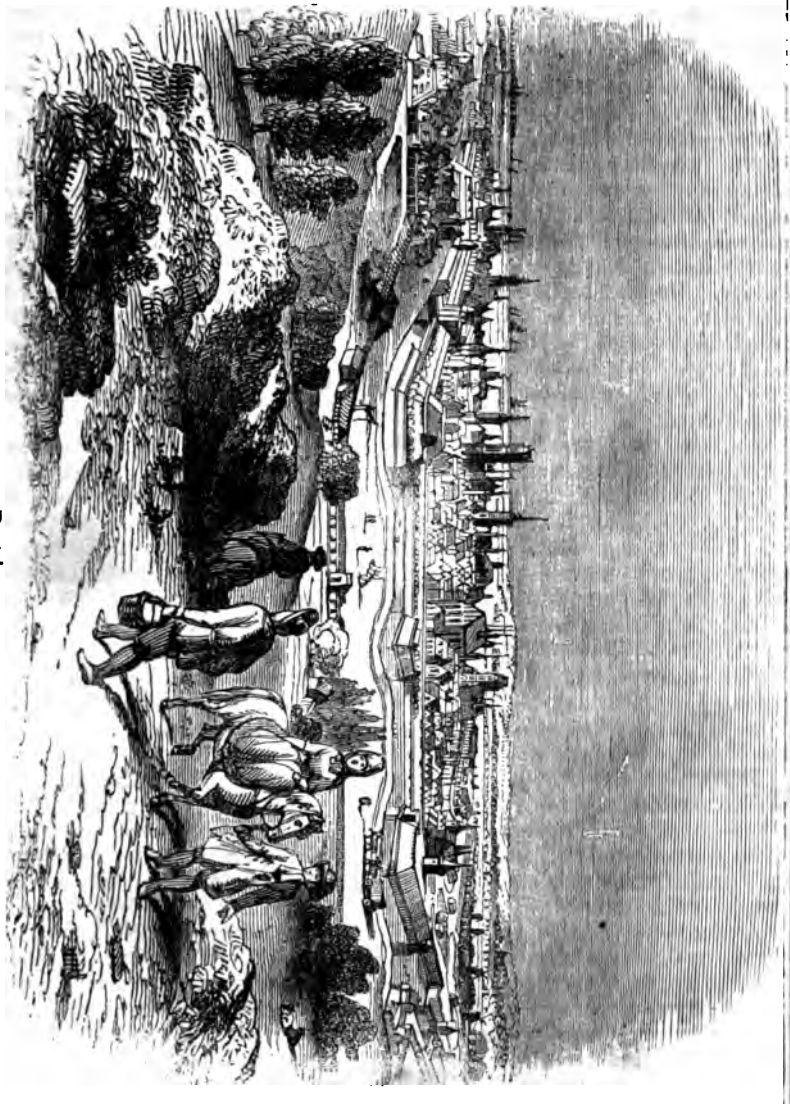
Elmira.

into it, which, on the melting of the snow in the high lands where they have their source, pour down a vast volume of water to their mouth. Notwithstanding the great extent of the Baltic, its form does not afford so large an area as might be expected for the purposes of navigation. Sailors complain that they have not good sea-room. Though the Baltic is about nine hundred miles long from north to south, its breadth at one point does not exceed thirty miles, and the mean breadth of its main body is not more than one hundred and twenty or one hundred and thirty miles. The gulf of Bothnia, the northern limb of this sea, four hundred miles in length, is only from thirty to one hundred miles broad; the gulf of Finland, running two hundred and eighty miles to the east, is from thirty to seventy miles broad; and the width of the gulf of Riga, extending about one hundred miles in the same direction, is only from twenty to sixty miles. Thus the complaint of mariners appears to be well founded; and, in addition, there are sand-banks in many places, and the waters are shallower than in the ocean. The waves do not rise high in storms, but are short and abrupt. As many as thirty-three British ships have been lost in a single year in the Baltic, and annually the loss may be estimated at two per cent.; while the commerce of the United Kingdom and the United States is carried on at a loss of only one per cent. by shipwrecks. Insurances on vessels for the Baltic are effected at a high rate to cover this serious risk. The British vessels employed in the Baltic trade do not average more than two hundred tons burden, and their crews consist of about nine or ten men. Vessels of larger size can not enter the harbors south of the gulf of Finland. North of this point the harbors are deeper, and would admit vessels of six hundred tons burden and upward; but as yet the trade is too inconsiderable to require any but small craft. The countries on the Baltic are actively engaged in shipping, but, from the comparative shallowness of their harbors, the vessels employed are of small size.

Merchant-ships usually take in a supply of provisions at Elsinore, and this alone is a considerable stimulus to its industry. The harbor is formed by a small wooden pier, and is only accessible to small vessels; but the roadstead affords good anchorage. The town is well built, and principally consists of one long street. The inhabitants, seven thousand in number, are engaged in shipping, the fisheries, and in a few local manufactures. Elsinore is about twenty miles from Copenhagen.

The neighborhood of Elsinore will always be interesting from its connexion with the supposed scenes of Shakspere's "Hamlet," and the popular traditions which have sprung from it. At the royal palace near Kronborg is a spot called "Hamlet's Garden," which Coxe, in his "Travels," says is traditionally asserted to be the garden in which Hamlet's father was murdered.

Dantzic is a commercial city and fortress on the west bank of the Vistula, about five miles from the Baltic, in the government of the same name, in the Prussian province of West Prussia, and 300 miles from Berlin. It has a very agreeable situation, in the midst of a beautiful country. Exclusive of the suburbs, it is about two miles in circuit, and is neither regularly nor handsomely built. Including the suburbs it contains 5,172 houses, and 54,756 inhabitants, of whom 2,148 are Jews. Its fine harbor and advantageous situation have procured it an extensive commerce by land and sea. It was an important member of the Hanseatic league, and was often called the granary of the north. As early as the tenth century it was called Gedance. For a long period it continued to change masters with the territory in which it lies. The Danes, Swedes, Pomeranians, and Teutonic knights, contended for its possession. In 1310, it fell into the hands of the last. The industry of the inhabitants soon restored its importance and prosperity, which had



Dantzic.

been diminished by the frequent wars, and inspired the citizens with such energy, that, in 1454, Dantzic declared itself independent, and was soon after recognised as such by the republic of Poland. The city then struck its own coins, with the image of the king of Poland, maintained a secretary at Warsaw, and voted in the diets of the kingdom, and at the election of king, by deputy.

In 1772, the city was almost surrounded by the Prussian dominions; its trade, industry, and population, continually declined, and the last king of Poland declared that he must leave Dantzic to its fate. May 28, 1793, the Prussians took possession of the outworks: the people immediately flew to arms, and a short struggle ensued, which, after a few days, terminated with the surrender of the city. It soon after regained its former prosperity, under the Prussian government, and continued to flourish till the breaking out of the war between France and Prussia. March 7, 1807, Dantzic was besieged by Marshal Lefevre, and surrendered on the 24th of May. The marshal was afterward rewarded with the title of duke of Dantzic. A military contribution of 20,000,000 of francs, to be paid by instalments, was levied on the city. By the peace of Tilsit, however, Dantzic was recognised as a free city, with a jurisdiction of two leagues in extent, which was afterward enlarged to ten miles by Napoleon, under the protection of France, Prussia, and Saxony; but, being occupied by a French garrison, it was not allowed to enjoy its independence. A French governor, General Rapp, continued in the garrison.

In 1808, the code Napoleon was introduced; and, by the continental system, its most important branch of support, the commerce of England, was cut off. Under such unfavorable circumstances, the year 1812 drew nigh, bringing the heavy burdens of the Russian war. December 31, the city was declared in a state of blockade. After a very obstinate defence of nearly a year's continuance, a capitulation was entered into, January 1, 1814. On this day, all the Poles and Germans were dismissed, and, on the second, the French marched out, to be conducted, as prisoners of war, to the interior of Russia. During this blockade and siege, 309 houses and warehouses were burnt, 1,115 buildings damaged, and ninety men perished by hunger. February 3, 1814, Dantzic fell again under the dominion of Prussia; and on the 26th of December in the following year, great damage was done by the explosion of a powder magazine.

There are in this city important manufactures of gold and silver lace, cloth, woollen stuffs, and Cordovan leather: sugar refineries, brandy and other distilleries, the vitriol, potash, &c., manufactories, are likewise considerable. An important article of commerce in Dantzic is corn, which is brought down the Vistula from Poland, and exported to England, Holland, and the Hanse towns. Other articles of export are timber, leather, wool, furs, butter, tallow, wax, honey, potash, hemp, and flax. The principal edifices worthy of notice are the high church of St. Mark (in which is the Judgment Day, by Van Eyck), the synagogue, the academical gymnasium, the marine institute, the buildings of the society of natural history, including their observatory. This society celebrated its eighty-fourth anniversary, January 2, 1826. It has also published its memoirs. On the side of the city between the Vistula and Nogat, is the fertile island of Werder, which supports numerous herds of cattle; and at the mouth of the former lies the fort of Münde, which defends the roads of Dantzic, called Neufahrwasser. April 9, 1829, the Vistula, swollen by the melting of the snow in the interior, and choked by masses of ice, broke through the dike, which extends twenty-five miles up the river, overwhelming fifty villages in its progress. The lower town of Dantzic was

undated, and the houses filled to the roofs. The torrent swept over the city, arrying away many houses and whatever they contained. On the 12th, the vaters began to abate; but as late as the 14th many sufferers were still emaining on the roofs of the houses, unable to obtain relief, and destitute of food.

Smyrna, for several centuries the most important *scala*, or place of trade, in he Levant, is situated in a deep gulf on the western coast of Asia Minor, and, with the exception of Constantinople, it is the most important seaport of the Turkish empire. Smyrna is the general entrepôt for the productions of the Levant, and ships of all nations crowd its port. The means of inland communication with distant parts of the interior, while they offer advantages n transporting European merchandise and colonial produce, equally facilitate the transit of the natural and artificial productions of the country to the place of shipment. Ships from every country are freighted with valuable cargoes both on the outward and homeward bound voyage. The roadstead s safe and capacious, the anchorage is good, and the largest ships can load and unload close to the wharfs. There is an American consul at Smyrna, who is vested with more than ordinary authority, the court of the consul usually constituting a civil and commercial judicatory. The Frank (European) population amounts to between three and four thousand, and out of about 120,000 inhabitants probably not more than 70,000 are Turks; 23,000 Greeks, 7,000 Armenians, and above 10,000 Jews, constituting the remainder. The higher orders of Franks are engaged in commerce, often on a large scale, and the lower class, consisting of persons from nearly every country on the Mediterranean, obtain employment as boatmen, carpenters, tailors, shoemakers, &c. The various component parts of the Smyrniote population do not present those striking peculiarities which might be supposed. The characteristics of each are sufficiently defined to be interesting, but the angular parts have been smoothened by the active commercial habits of the place. Mr. Macfarlane, in his "Constantinople in 1828," states, in his notes on Smyrna, that "a turban and caftan would make the Frank a Turk; and a hat and coat, the Turk a Frank." The French preceded in the trade of the Levant, and they are sufficiently numerous to give the tone to society among the Franks. The French language has superseded the Italian in the superior class of society, but the shopkeepers, and persons of their class, speak a corrupt Italian, called "Lingua Franca." Newspapers are published in the French language. Smyrna boasts the title of "Le petit Paris du Levant," but though the distant view of the town is fine, the streets are crooked and narrow, and the majority of the houses are built of wood: it is probably the prevailing ease and gayety of social intercourse which has tempted the comparison. The houses on the quays make a good appearance and are handsome.

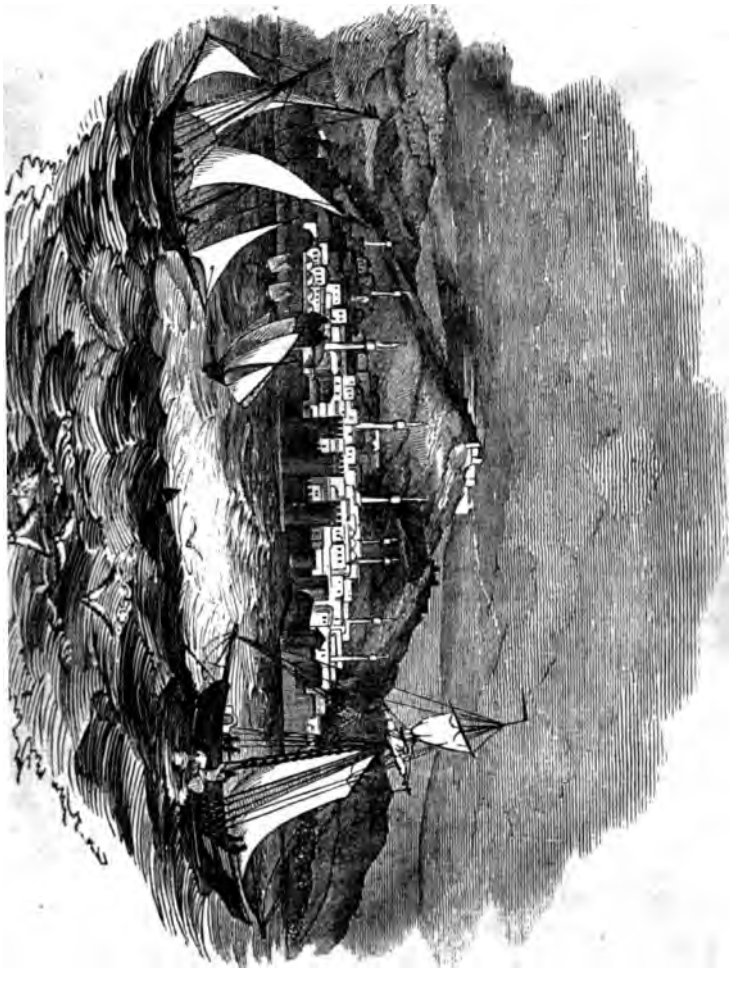
The English, the Venetians, Genoese, and other Italians, the Dalmatians, Dutch, French, and Americans, have commercial establishments. No other town either in Asiatic or European Turkey has so extensive an export and import trade. Purchases or sales are effected by brokers, who receive instructions from the buyer and seller, and the respective brokers of each party settle the terms of the bargain, after which the real buyer and seller confirm the transaction at a personal interview. The brokers are principally Jews. The Greek dealers are in general petty shopkeepers, very cunning and very bad payers. The Jews have similar defects, but are well supported by their brethren, who generally become guarantee for each other. The Armenians are by far the largest traffickers both for buying and selling; and, though hard bargainers, are mostly all solvent, and honorable as well as honest. The

Turks are, however, as far superior to the foregoing races in all moral qualities as they are inferior to them in means and commercial abilities; yet they sometimes deal largely, and their bond is as punctually discharged, in general, as the day comes when it falls due. The number of native dealers insolvent was at one time very large. There is a Turkish tribunal of commerce, where disputed accounts and other similar matters are disposed of, usually in a straightforward and rational manner.

The largest article of import is coffee, which is the favorite beverage of the inhabitants of Turkey and Western Asia. It is said that at Smyrna, in a population of 120,000, there are 400,000 cups of coffee drank daily, the cost of which is 20,000 piastres. The largest portion of the supply of coffee is derived from America, and England and France rank next, after which follow Holland, Trieste, Leghorn, and Genoa. Sugar is the next in importance, and the supply is furnished by the same countries from which coffee is imported. Indigo is chiefly supplied by England, and tin exclusively. The most extensive branch of imports consists of manufactured goods, the demand for which is daily becoming more extensive. The native consumers are exceedingly fastidious in their choice of designs and colors, which ought very frequently to be altered to meet their capricious taste.

The silk produced at Brussa, about two hundred miles from Smyrna, is forwarded by caravans, and is the richest raw article of export. Drugs and gum are exported in the largest quantities to the English market. Galls for England, Germany, and France, but chiefly the two former countries; valonia which employs more British shipping for full cargoes of only one article than any other species of produce, with the exception of fruit; these, with madder sponges, olive-oil, wax, hare-skins, goats' and sheeps' wool, complete the list of articles of export. The export of figs and raisins, which may be regarded as the great staple of Smyrna, gives extraordinary activity to the town. Figs are shipped in September, and raisins in October. The former are all brought to Smyrna, but to procure a cargo of the latter it is necessary to proceed to the ports near the district where they are produced. Chesmé, a town of about five thousand inhabitants, owes its prosperity to the trade in raisins, which are grown in immense abundance in the neighborhood. Vourla is another port whence raisins are shipped in large quantities. The Sultana raisins are, however, shipped at Smyrna.

Odessa, a Russian seaport, in the government of Cherson, is situated on the Black sea, between the mouths of the Dnieper and Dniester, on the bay of Adschai. This place, which is now of considerable size, and rapidly increasing, is of modern origin. After the cession of Bessarabia, by the peace of Jassy, in 1792, Catharine fixed on this spot, then containing only a few houses, as a commercial emporium. It has a sufficient depth of water for the largest ships-of-war. Alexander carried into execution the designs of Catharine, and appointed Richelieu, who was then a French emigrant, and has since been prime minister, governor of the city. It is built in the form of an oblong square, and fortified in the modern style. The port, which is artificial, is capable of receiving three hundred vessels. The roadstead is extensive, and the anchorage is safe in summer, being sheltered from every wind except the southeast. The streets are straight, wide, and cross each other at right angles; there are some fine walks, and numerous public buildings. Water was scarce, but has been supplied by aqueducts. There are many institutions for education here. The commerce of Odessa has become extensive. In 1826, five hundred and seventy-eight ships entered the port. The chief articles of export are grain, timber, hides, fur, flax, linen, wax,



tar, potash, caviar, &c. Greeks, Italians, French, Poles, Armenians, a Germans are among the inhabitants of Odessa.

WIESBADEN, or Wisbaden, is one of the most frequented inland waterin places in Germany. It is full of large and handsome hotels, to nearly every o of which is attached a table d'hôte, or ordinary, where strangers dine; for Wiesbaden it is not the custom to take dinner in private. The best frequen ed tables d'hôte seldom consist of less than two or three hundred guests the full season; one o'clock is the general dinner-hour. The meal is accor panied by a tolerable band of music, who are posted aloft in a gallery, a who afterward go round the tables to receive a trifle in remuneration for the services from each person who thinks proper to bestow it. The tables a arranged much in the same manner as at our large public dinners, and t dining-hall is generally decorated with great taste, and made in every respe as convenient as possible: one hotel, however, *Der Adler*, that is, the Eag has its dining-room built immediately over some hot baths that are supplie by the boiling springs, which in summer cause the situation to be rather warm one. The music played at these places of entertainment is mostly ve tolerable; the dinner, for those who like German cookery, good and chea the company well-behaved, and, from their variety of nation, quite amusin

The central part of the principal public building is the ball-roo The left wing is occupied by gambling-tables, of which that appropriated roulette is the favorite; and so great are the profits derived, that the lesse pay 30,000 florins annually to the duke of Nassau, for the privilege of kee ing the bank. The right wing is a sort of café, or dining-room, in which kinds of refreshments are to be obtained; and it is never used for any oth purpose. Although the exterior of the building is exceedingly plain a simple, the interiors of the wings are neat and convenient, and the ball-roo is handsome, and even splendid. The floor is inlaid with various wood a row of marble columns of the Corinthian order runs up each side of t room, and supports a light and spacioua gallery; a considerable number marble busts and statues are ranged beneath this double colonnade; the ro is vaulted, and though rather sombre in color, is tastefully decorated, and t whole apartment is of large dimensions.

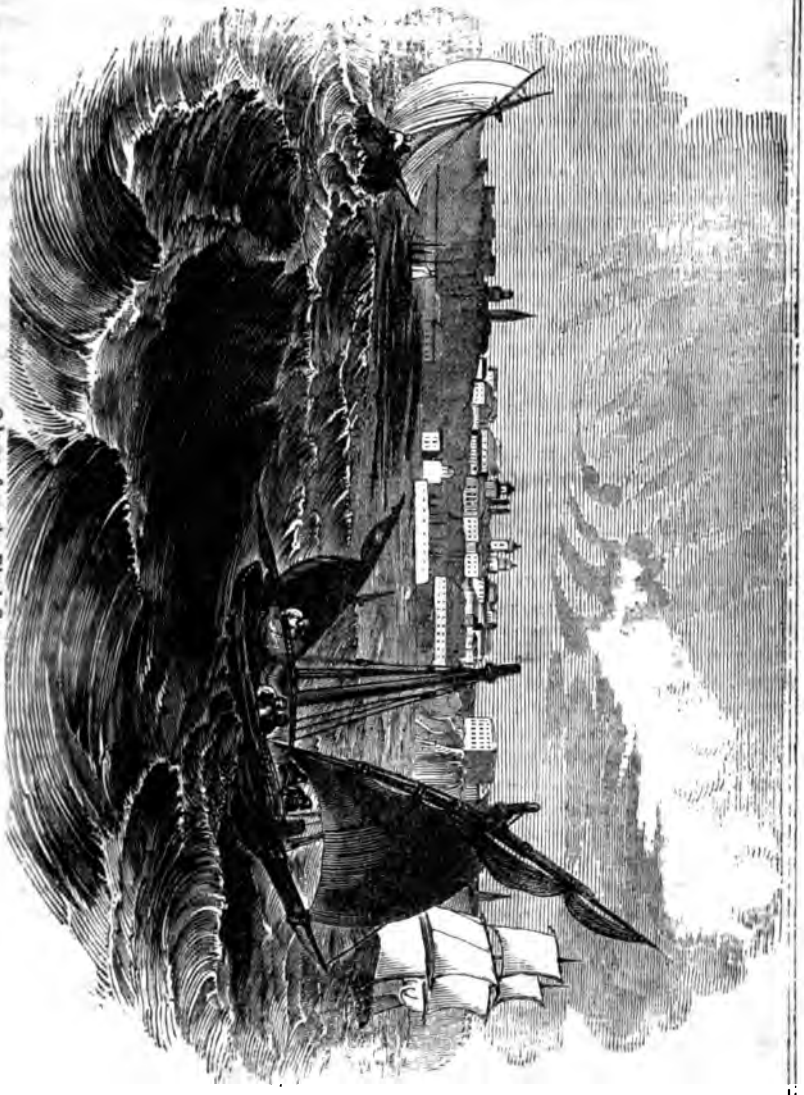
These three rooms and the park which is attached to them, serve as t usual place of assembly for the numerous visiters during the season; a when it is recollected that many thousands annually congregate from all pa of Europe to this town, it will be evident that some such point of union is required. The famous boiling-springs of mineral water, and t baths which they supply, are in the town itself, at some little distance fro the public rooms; but as not more than one person in fifty comes to Wiesb den for any other purposes than those of amusement or intrigue, that circu stance is of but little consequence. It is, besides, the fashion for those inv lids who do bathe or drink the waters, to visit the spring very early in t morning, seldom later than half-past seven or eight, so that the means to taken for the restoration of their health, do not interfere with the amusemen of the day.

The following bill of fare of one of the principal hotels is given, in ord to convey some idea of the method and materials of a German dinner:—

1st course. Soup served from a side-table; the principal ingredients in i composition are rice, milk, water, melted butter, and meat-boilings.

2d. Beef (not salted) boiled to rags, cut in slices, and sent to table wi cucumber. After which enter—

3d. Small dishes ranged along the table, containing peas, kidney-bea potatoes, small carrots, and stewed cabbage.



Odessa, from the Black Sea.

(Here pause for half an hour, and listen to the band, and talk to your acquaintances.)

4th. Slices of fish, either hot or cold, on small dishes.

5th. Prunes, or cherries, stewed, placed all the way down the table alternately with salad.

6th. Rice-pudding surrounded by a moat of fluid custard.

7th. The roast-meat, generally chicken, or a leg of mutton falling to pieces, or a duck so much cooked that it may be served with a spoon. These are set on the table just to be looked at for one instant, and then are taken away, carved by the waiters, and handed round to each guest.

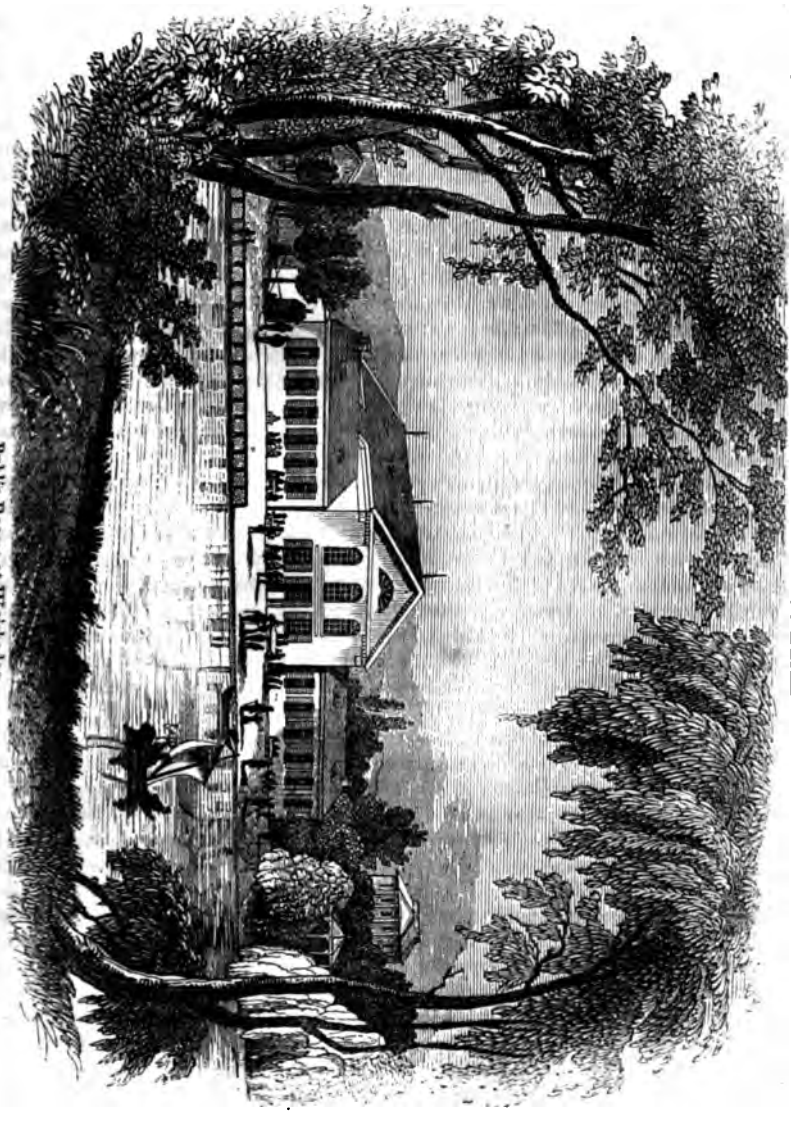
8th. Dessert; the best part of the dinner. The usual price of the whole, including perhaps a pint of table-wine, is three francs, or sixty cents.

At about three o'clock, the company disperse; the gentlemen to smoke their pipes, and the ladies to work at their knitting. Several times a week an admirable band plays in the afternoon in the public gardens, and is always stationed under the fixed canopy which is seen in the extreme right of the engraving; and during their performance visiters sit in the open air on chairs which they can hire on the spot for that purpose, and which they can place either by the side of the lake or beneath the shade of some neighboring tree. Twice a week there is a ball, which begins and ends at an early hour. Scarcely any other dances than waltzes are performed; and it is the custom for gentlemen and ladies to take a turn into the open air during the intervals of dancing, and after a short promenade, to step back to the ball-room. Before it is late, every one retires, and rises at six or seven o'clock the next morning, again to pursue the same routine.

One of the favorite occasional amusements at Wiesbaden, is firing with a small air-gun at a target from a little wooden lodge, like a sentry-box. Both the target and the lodge are shown in the engraving, just beyond the left wing, under a small grove of catalpa trees. The price charged for each shot is two kreutzers (not quite two cents): if you hit the bull's eye, the shot is gratis. The air-gun does not fire bullets, but a little pellet which is armed with a point, and tufted behind with a bunch of hair like that of a camel-hair pencil, to catch the condensed air, and to make the pellet fly straight after it is projected. The target is fixed in the upper part of an upright box, which is something like a Punch's theatre; and it is so contrived that when the bull's eye is struck by the pellet, two pasteboard figures representing soldiers start from the wings of this theatre in announcement of the victory. Indeed, rifle shooting in all its branches is a very general recreation, or rather pursuit, throughout this district of Germany: and in the shooting-yards in the environs of Frankfort, a similar piece of machinery is attached to the rifle-targets.

Besides the public rooms and the extensive grounds that are annexed to them, Wiesbaden also possesses a very pretty little theatre, which has a tolerable second-rate company of actors, enlivened occasionally by the addition of some star from the larger towns of Germany. The duke and duchess of Nassau not unfrequently drive over from their palace at Biberich, for the purpose of attending the performances, and honoring the entertainments with their presence.

Wiesbaden is situated in a hollow surrounded on all sides by distant hills. Though not very far distant from the Rhine, the rising ground between the town and the river is sufficient in height and extent to protect it from the damps which rise from that mighty stream in the evenings of summer and autumn; and its low position, together with the constant though inconsiderable quantity of heat which is given out by the boiling springs, tend in some degree to soften the severity of a German winter.



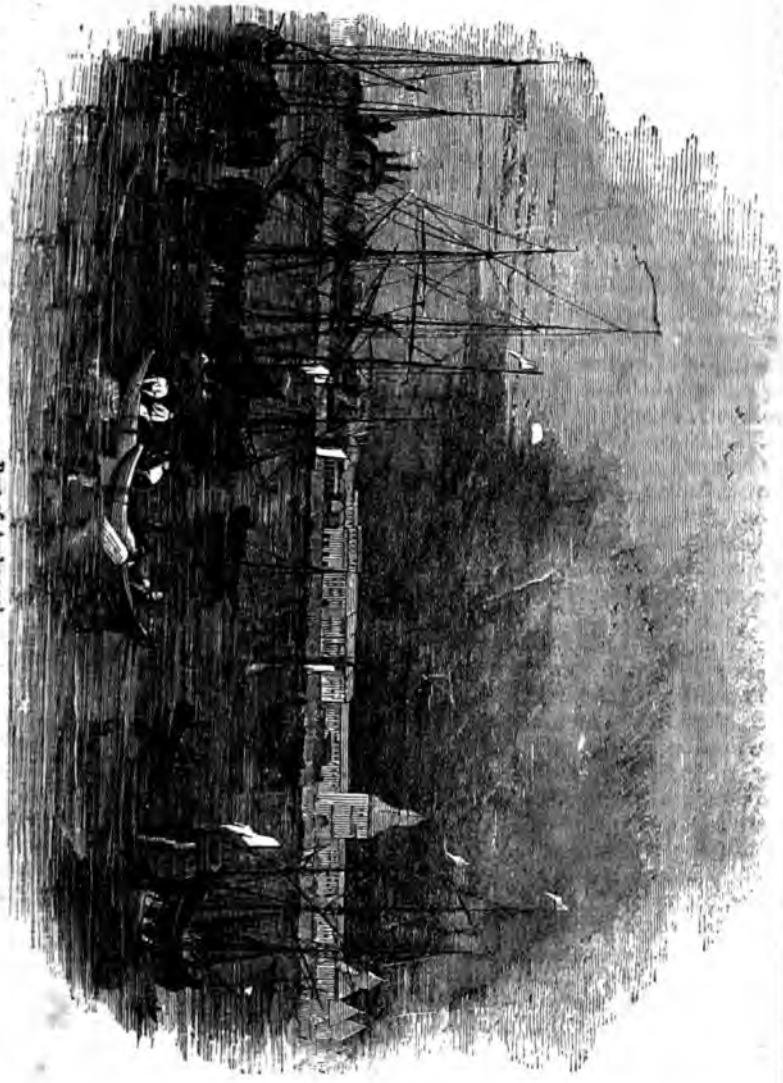
Public Rooms at Wiesbaden.

Wiesbaden, from its late increase in population and in buildings, and from the sum of money annually spent there by its crowds of idle visiters, has now become the most important town in the principality of Nassau. The residence of the reigning duke (*Herzog*) is at Biberich, a small village on the eastern bank of the Rhine, and the sovereign is also the proprietor of a great part of his own dominions. This little realm is about forty-eight miles in length, and twenty-eight in breadth; and though it is for the most part woody and mountainous, yet it is not without fine arable and meadow land. The duke derives great revenues from the numerous favorite watering-places which are scattered about his principality: the sale of the famous Selters water alone produces great profit. Besides his palace at Biberich, he has a handsome and convenient hunting-palace called the Platz, which is situated on the summit of a wooded hill about three miles out of Wiesbaden. From the top of the house there is a very fine and extensive view commanding a long reach of the Rhine; and the towns of Mayence, Biberich, Darmstadt, Wiesbaden, and Frankfort, are included within its horizon. The palace is most appropriately fitted up, and the circumstance that it is a hunting-lodge, is brought forward in the minutest article of furniture. Everything in the principal apartments is made of deer's antlers, or what we call buck's horn; chairs, sofas, writing-tables, and even chandeliers and clock-cases, are all composed of the same material. The grand entrance is flanked in each side by a bronze statue of a red deer, and the saloon is decorated with some very clever paintings by a Viennese artist, representing deer under various circumstances and in different situations.

Archangel.—This is the chief city in a Russian district of the same name, which contains 356,400 square miles, with 263,100 inhabitants, among whom are 7,000 Samoiedes. It lies between twenty and thirty miles from the mouth of the Dwina, on the White sea, in longitude forty degrees forty-three minutes east, and latitude sixty-four degrees thirty-two minutes north. It contains nineteen hundred houses, and fifteen thousand inhabitants. The monastery of Michael the Archangel, founded there in 1584, gave the city its name. The English first discovered a passage thither through the Frozen ocean in 1553, and, until the building of Petersburgh, it was the only port whence the productions of Russia were exported.

When Petersburgh became a place of export, and Riga also was used as a Russian port, the trade of Archangel sank, till 1762, when Queen Elizabeth granted to it all the privileges of Petersburgh. The trade on the Dwina has since increased more and more with the growing population of Russia; and this city has become the chief mart of all imports and exports for Siberia, being connected by canals with Moscow and Astracan. In June or July, foreign vessels arrive, which sail again in the month of September or October. In these summer months there is a perpetual market for fish, fish-oil, tallow, grain, various sorts of fur, skins, ship-timber, wax, iron, coarse linen, hogs' bristles, china and japanned wares, caviare, sturgeon, &c. More than two hundred vessels arrive annually; in 1823 two hundred and thirty sailed. The trade is seriously obstructed by a sand-bank, affording only twelve and a half feet of water at the entrance of the harbor, which is in other respects good. The fortification of Novo-Dwiesk protects the entrance. There are now dockyards here for ships-of-war, which are built by the Russian government in Archangel as cheap or cheaper than they can build them in any other place; also an excellent warehouse for foreign merchandise subject to a duty.

In April, the ice breaks up at the mouth of the Dwina, on the banks of which, sixty-five degrees north latitude, the vegetation of grain and fruit entirely ceases. Seventeen versts from the city is the anchoring-place of ships.



Port of Archangel.

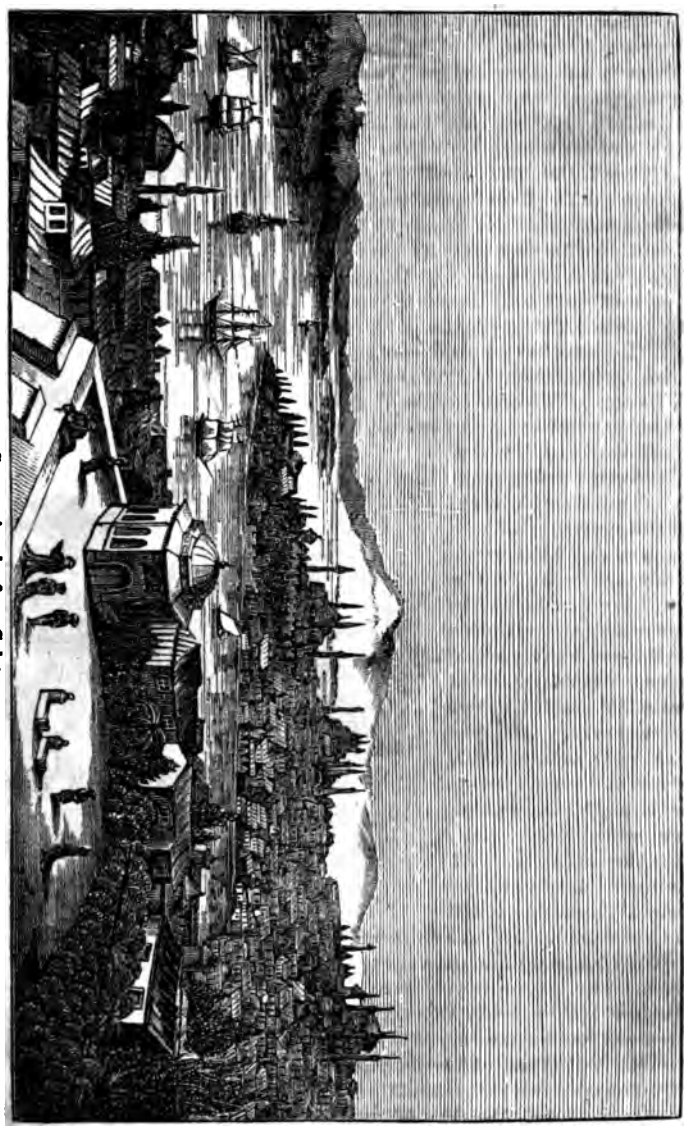
with three docks. A civil and military governor, and an archbishop, reside at Archangel. The house of the admiralty, and the barracks of the soldiers, are situated on the island Solombol, formed by the river Cushcenida. In 1816, the value of imported goods subject to duties was 1,138,000 roubles, and of the exports, 8,600,000 roubles.

The shortness of the nights during the time the harbor is navigable, presents a natural obstacle to smuggling. In the other extremity of the year, the shortest day is three hours and twelve minutes long. Many expeditions, every year, for fishing and hunting, go from this place to Spitzbergen and Nova Zembla, by water in summer, and by sledges in winter, to the mouth of the Lena, and perhaps further.

Constantinople (the city of Constantine); called by the oriental nations, Constantinia; by the Turks, Istambol; and by the Wallachians, Zaregrad (royal city)—was built by Constantine the Great, on the site of the city of Byzantium, consecrated in the year 330, and named from him. It was, till the year 1453, the capital and residence of the emperors of the east, and has been, since that time, the capital of the Turkish sultans. The city has been besieged twenty-four times, but taken only six, viz., by Alcibiades, Severus, Constantine, Dandolo, Michael Palæologus, and Mohammed. It lies in the government of Rumelia, on the sea of Marmora, and at the southwestern opening of the Thracian Bosphorus, which separates Europe from Asia. It has a large and safe harbor. A view of the city, as seen from Galata, is given in the accompanying engraving.

The interior of the city but ill corresponds to its noble amphitheatrical site and the splendor of its mosques and palaces. The streets are generally narrow, dirty, and steep; the houses for the most part low, and built of mud and wood. There is also a great want of open squares. The largest open space is the Atmeidan, which is two hundred and fifty paces long, one hundred and fifty broad, and ornamented with an obelisk of granite sixty feet in height. The air is healthy; but from the neglect of all precautionary measures, the plague is brought hither from Egypt almost every year. The heat of summer is moderated by the winds from the Black sea, but these winds often produce a change from heat to cold which is very unpleasant.

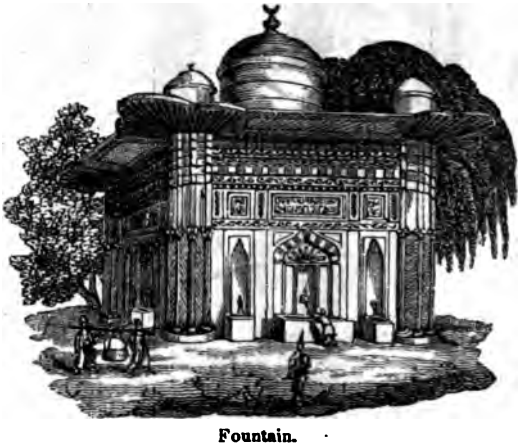
The city, without including the suburbs, is about eleven or twelve miles in circumference. Including the suburbs, it is about fifty-five miles in circuit. The number of inhabitants in the city and suburbs is estimated by Van Hammer at six hundred thousand, by others at one million, of whom more than two hundred thousand are Greeks, forty thousand Armenian Christians, sixty thousand Jews, and the remainder Turks. Before the last great fire, the city contained eighty thousand houses. It has the form of a triangle, with bent sides, and an obtuse angle at the vertex. This vertex borders upon the straits, the north side upon the harbor, and the south upon the sea of Marmora. The west side, or base of the triangle toward the main land, is the longest of the three sides, and extends in a somewhat curved direction from the harbor to the sea of Marmora upon the south. Upon the southwest side, not far from the sea, and within the wall, is the fortress of the Seven Towers. It included at first seven, afterward eight towers, of which four were destroyed by an earthquake in 1754, and one in 1766. In the quarter belonging to the arsenal, which extends around upon the outside of the fresh-water canal, are reckoned some portions of the city which extend toward Galata. They are comprehended under the name of Cassim Pacha. Here are the residence of the capudan pacha, the arsenal, the navy-yard, and the prison of the galleys. Not far from this is the bagnio, or prison of the royal slaves, who are cruelly kept at hard labor in this swampy place. The suburb of Galata, surrounded



Constantinople, from Galata.

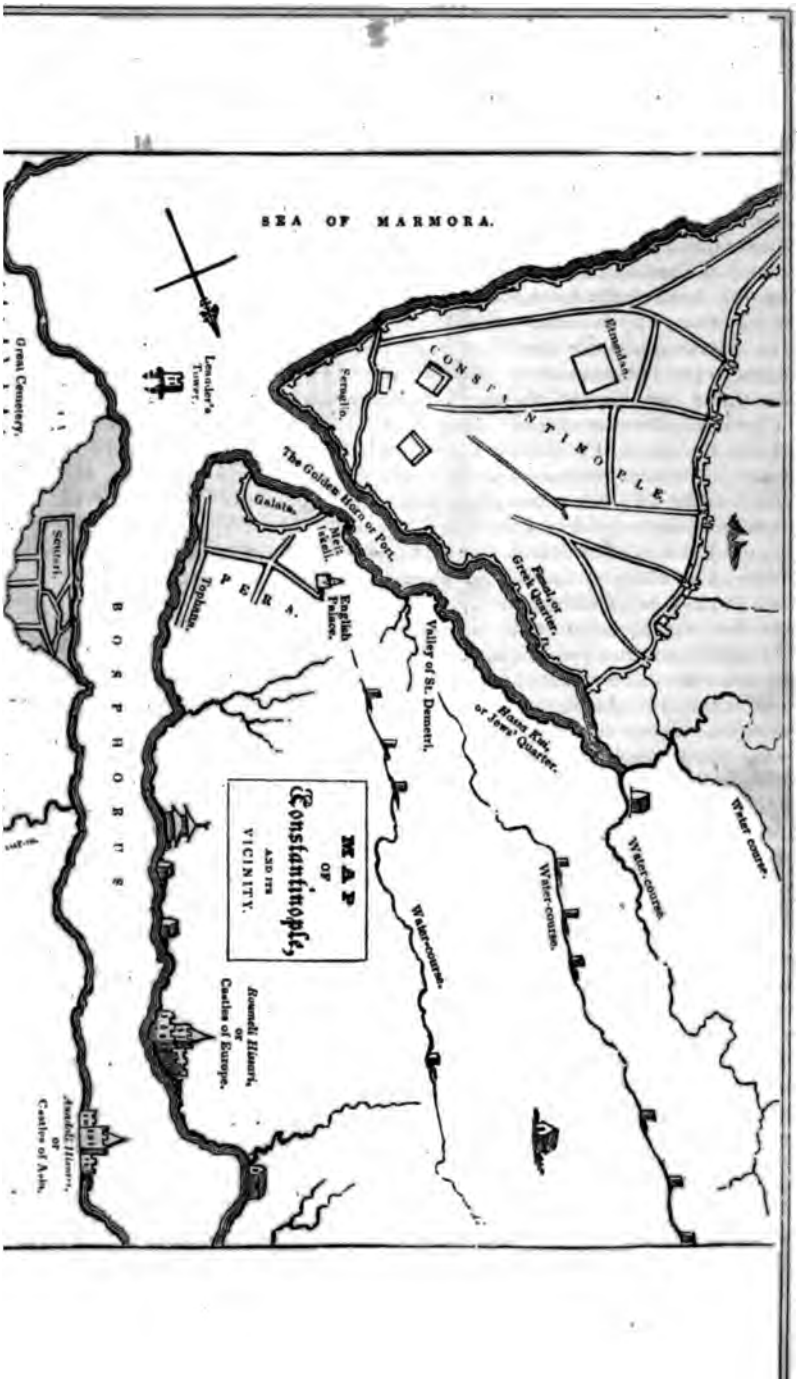
by a wall of its own, lies opposite the end of the seraglio, upon the harbor or strait which comes from the Black sea, is of considerable size, contains many large houses, and is the residence of the European merchants. Higher up the channel lies Top Hana, which derives its name from the cannon-foundry. Upon the heights near Galata and Top Hana lies the suburb of Pera, in which the European embassadors reside. Not far from this is the open burying-place for Europeans; and upon the heights just by is the suburb of St. Demetrius, inhabited for the most part by Greeks. The fortifications of Constantinople are unimportant. A wall, provided with five hundred and forty-eight towers, partly of stone and partly of brick, which, toward the land, is double, and bordered by a broad ditch, surrounds the whole city. Upon the side toward the land there are six gates, upon the sea of Marmora seven, and as many as thirteen upon the harbor, besides numerous smaller ones. The suburbs are, for the most part, open; but some are surrounded by old walls, built by the Greeks and Genoese. The seraglio is a collection of dwellings, baths, mosques, kiosks, gardens, and groves of cypress.

To the southeast of it lie the gulf of Nice, the coast of Asia, and especially Scutari; toward the northeast it borders upon the beautiful environs of the straits of Constantinople, and the suburbs of Top Hana, Pera, and Galata, which rise like terraces on the side of the hills opposite to it. With its gardens, it forms a little city by itself, and is surrounded by a high wall, which is guarded by cannon upon the side toward the strait. These are discharged during the walks of the sultan, and also to celebrate occasions of public rejoicing. —Single discharges indicate the execution of state-criminals within the walls of the seraglio. The chief entrance —before which, upon the one side, is the ancient church of St. Sophia, and upon the other a beautiful fountain, opens into the first court, which is irregular and badly paved, having on its left the mint, and on its right the stables, together with a large hospital and other buildings. At the distance of about a thousand paces from the outer gate is the second. It is like the first, guarded by *capidschis*, and leads to a second court, smaller but more elegant than the first. The edifices by which it is surrounded are not of uniform height, and are in part ornamented with colonnades. In the centre of the court is a beautiful fountain surrounded by cypresses and wild mulberry-trees.



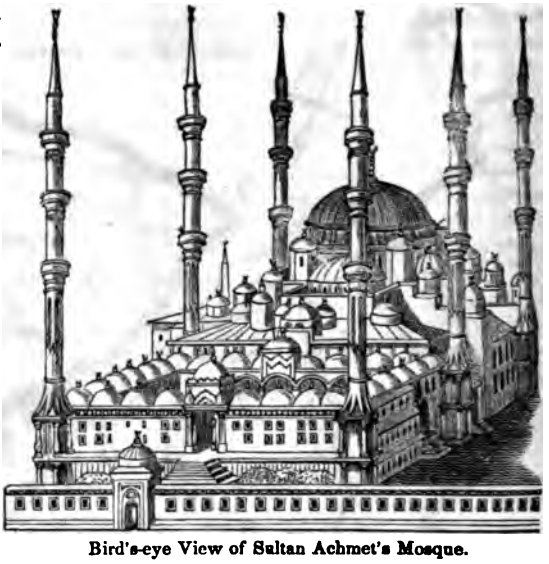
Fountain.

The most important of the edifices comprised in this court is the divan. To this succeeds the third court, into which Turks only are admitted, and none, even of these, who do not belong to the court, or are not especially commanded to enter. The embassadors pass by a covered way from the divan to the audience-chamber of the sultan, which is in the real seraglio, and is a splendid apartment, though small and dark. Beyond this lie the apartments of the sultan and his wives, into which it is not allowable to enter. Externally are discoverable a number of large, irregular edifices, which are sur-


MAP
OF
Constantinople,
AND ITS
VICINITY.
SEA OF MARMORA.
CONSTANTINOPLE.
Hippodrome.
Seraglio.
Leander's Tower.
Great Cemetery.
Scutari.
The Golden Horn or Port.
Galata.
Pera.
Topkana.
English Palace.
Valley of St. Demetri.
Fanal or Greek Quarter.
Hasan Kale, or Jews' Quarter.
Water course.
Water course.
Water course.
Water course.
Rumeli Hisari, or Castle of Europe.
Anadoli Hisari, or Castle of Asia.
BOSPHORUS

mounted by cupolas covered with lead. Besides this chief seraglio, there is also, in the centre of the city, the *Eski Serai*, built by Mohammed II., in which are shut up the wives and slaves of the deceased sultans, who have, however, the privilege of marrying and leaving it if they choose.

The number of *dschamis* and mosques in Constantinople amounts to nearly five hundred. The principal of the royal mosques is that of St. Sophia, which is advantageously situated on an eminence in one of the best and finest parts of Constantinople; it was formerly a Christian church, having been built in the sixth century by the emperor Justin, and afterward enlarged and beautified by Justinian: and though the Turks have now converted it into a mosque, it still retains its ancient name.—This edifice is two hundred and seventy feet in length by two hundred and forty in breadth, having in the front a portico thirty-six feet wide, supported by marble columns, which, in the time of the Greek emperors, served for a vestibulum, where such persons were appointed to stand as intended to receive the sacraments, or undergo public penance. This portico has a communication with the church by nine stately folding doors, the leaves of which are of brass, and adorned with fine bas-reliefs: and on the middlemost some figures of Mosaic work may still be discerned. Another portico, parallel to this, has only five brazen doors without bas-reliefs, but was formerly charged with crosses, which the Turks have defaced.



Bird's-eye View of Sultan Achmet's Mosque.

The body of the mosque is covered by a dome of admirable structure, at the foot of which runs a colonnade, sustaining a gallery ten yards broad, which, when the Christians were masters of it, was set apart for the women; and over this are two small galleries, supported by columns and arches of excellent workmanship, answering to those below. The dome is said to be one hundred and thirteen feet in diameter, and is built upon arches, supported by vast pillars of white marble. The incrustations of the gallery are Mosaic, mostly done with little cubes of glass, which by time are continually loosened from their cement, but their color is fresh and unchangeable. The form of the dome is that of a hemisphere, or half-globe, and it is illuminated by twenty-four windows placed round it at equal distances. It was formerly adorned by four cherubim and other figures, but these have been defaced by the Turks, who do not admit of any imagery or painting in their mosques.

On the east side of this vast cupola is a semi-dome, which was the sanctuary or chancel of the Christians; and here is now a niche, wherein the Turks keep their Koran, containing the revelations, doctrine, and predictions, of their prophet. This niche is in that part of the dome which stands toward Mecca, and the niches in all their mosques are placed in the same manner:

the Mohammedans always turn their faces that way when they say their ıyers.

At a little distance from the niche is the mufti's chair, raised on several ıps, and on the side of it is a kind of pulpit, where certain prayers are reated by persons appointed for that purpose. The Turks have been acsed of pulling down some parts of this edifice since they took it from the ıristians; but instead of this, they have added four of those tall, slender narets before mentioned. Every royal mosque has at least two minarets, d one of them has six, but the ordinary mosques have seldom more than e. About the middle of these, on the outside, there are usually three balnies or galleries, one above another, to which the imaums ascend by stairs thin, and, with a shrill tone, give notice to the people to come to their votions.

There are five thousand oratories, besides twenty-three Greek, three Arenian, one Russian, and nine catholic churches; one hundred and thirty ıblic baths; eleven academies, in which sixteen hundred young Turks are ucated at the sultan's expense, for the future service of the church and ıte; five hundred and eighteen high establishments for education *(medrese)*, which the pupils are supported and instructed gratis; thirteen hundred ildren's schools; thirteen public libraries, few of which, however, contain ove two thousand manuscripts, and none any printed books; there are also any caravansaries; a mathematical and nautical school; Turkish, Jewish, ıd Armenian printing-offices; and a great number of coffeehouses, ornaented in the Chinese style, and singularly painted, in which people of all asses mix together, many of whom smoke, in the course of the day, thirty forty pipes of tobacco, and drink as many cups of coffee: to the class of ıblic houses belong also the *teriakhane*, or opium-booths, where the guests ıerally assemble in the evening, chew their pills of opium, drink a glass cold water, and await the intoxicating results.

The manufactories supply morocco, cotton, silk, and linen cloths, carpets, ms of various sorts (including bows and arrows), gold, silver, and embroiıry; there is no want of dyers, stone-cutters, jewellers, &c. Trade is chiefly ınducted in the khans and bazars. In the latter are to be found merchants om all parts of the Turkish dominions; these bazars are large buildings of one. One of them, the *Misr chartsche*, or Egyptian market, contains goods om Cairo, especially minerals and medicines. Other parts of the bazar are cupied by jewellers and booksellers, who keep for sale Turkish, Persian, ıd Arabian manuscripts. For the most part, particular articles are to be und in particular streets: thus the dealers in furs, the shoemakers, and pipeakers, have each their own streets; the bazars do not, as formerly, teem ith the wealth of the east, but are still places of great interest; two *kiayas*, deputies, appointed by the government, superintend the management of ese repositories, and answer for any theft or disorder committed within the alls; the buildings are all fire-proof, and are the places where wealthy urks deposite their most valuable property, and where sales by auction are ld. The *charshis* are used for the retail trade: these are an immense asmblage of shops, where all the different trades are carried on, and almost erything requisite for food, clothing, or furniture, may be purchased; these ıdless rows of stalls along each side of a covered street, wherein the article often manufactured as well as sold, present a constant succession of novel ıjects, and the motley throng of purchasers is amusing and instructive. Seıte Turks, saturnine Armenians, swaggering Ghaliyonjis, saucy Franks, in-bearded Arabs, Bostanjis, with their long-tailed scarlet caps, dervishes, owned with dirty caps that look like extinguishers—are all crowded to-

gether, each driving his own bargain, and betraying, by his physiognomy and gestures, the characteristics of his calling, nation, and habits.

Constantinople, besides the many splendid and spacious mosques with which it is adorned, can boast of hospitals, almshouses, schools, colleges, and public libraries, such as rival the rich institutions founded by the califs of Bagdad and Cairo, and surpass any now existing in other parts of the Mohammedan world.

The Turkish baths contain three spacious apartments, one within the other, paved with marble, and lighted by holes in the dome above, filled with colored glass. In the first chamber, the attendants prepare the linen and other articles used by the bathers. In the second, the visiters undress, and fasten round their waists a thin covering, which hangs down to the ankles. They then enter the third room with high wooden clogs on their feet, to protect them from the floor, which is heated by vapors from a caldron immediately beneath. The bather is stretched out upon a raised platform, and the attendant scours him well with cold and warm water, rubbing him with *keffi-kil*, a perfumed saponaceous earth. Numbers of persons of the same sex bathe together, but everything is conducted with the strictest regard to decency. The baths are open to women in the daytime, and to men at night. A clean shirt is thrown over the bather, and a handkerchief tied round his head, as soon as his ablution is completed, and he returns into the antechamber, called *jamekan* (dressing-room), where a clean bed is ready for him, and he falls into a refreshing slumber, accompanied by a luxurious sensation of repose, hardly conceivable by those who have not enjoyed it. *Shampooing* is seldom used by the Turks, except in the case of women a short time after confinement.

Mocha. Arabia.

SUBJECT XIII.

REMARKABLE EDIFICES.

E have alluded to some of the picturesque cities, and propose now to mention a few of the public edifices distinguished for architecture, beauty, or for other reasons.

In no country in Europe is there so much encouragement for the fine arts as in Bavaria. The present king, an enthusiastic admirer of all that relates to architecture, painting, and statuary, devotes nearly the whole of his private funds to the adorning of his capital with fine buildings, and filling them with the productions of the best modern painters and sculptors. Within these few years two grand edifices have been erected, designed to contain the king's collections of and pictures—the Glyptothek and the Pinacothek.

GLYPTOTHEK, which was the first commenced, is now completed. It is e building round an open court, and in the front is a splendid portico ve Ionic columns; the windows all open into the central court. This g was erected by the present king of Bavaria, out of his yearly , and was commenced when he was crown prince, for the purpose of ing his collection of statues. Mrs. Jamieson, in her "Visits and es at Home and Abroad," was the first to make us acquainted with t treasures of art at Munich, and with the merits of the modern Ger- inters. She has given a minute description of the whole of this splen- lding. "Just returned," she says, "from my first visit to the Glypto- ith my imagination still filled with the 'blaze, the splendor, and the try,' excited as I never thought it could be excited again, after seeing ican; but this is the Vatican in miniature. Can it be possible that rious edifice was planned by a young prince, and erected out of his savings? I am wonder-struck! I was not prepared for anything so s, so magnificent, so perfect in taste and arrangement."

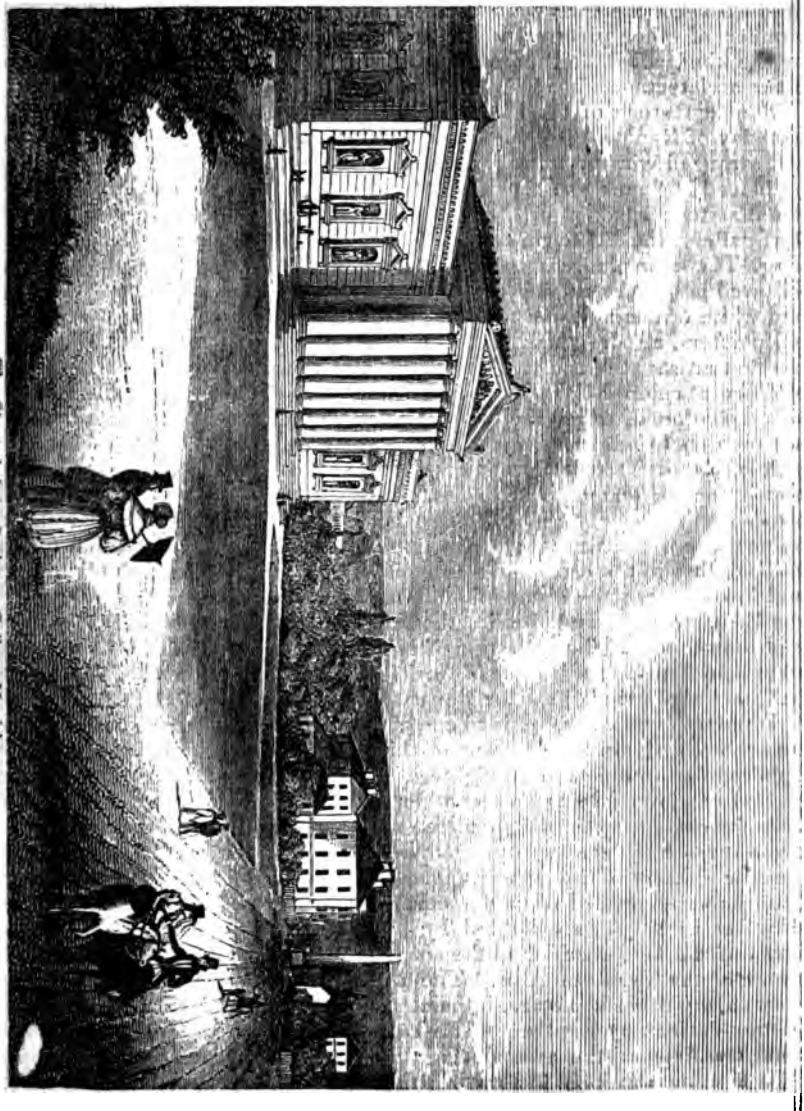
portico leads to a fine entrance-hall, from which two side-doors con the galleries (twelve in number), from fifty to one hundred and thirty length. This building was designed by Baron Klenze, one of many ished architects at Munich, and who is also the favorite artist, com- and friend, of the king. The objects of sculpture in the different s are so arranged as to form a progressive history of the rise and de- f the art. The most important examples, however, contained in this cent collection are the Egina marbles. These marbles were probably d in the age immediately preceding the time of Pericles, and exhibit ance in the art of sculpture which, however interrupted by a succes- destructive wars, was about to approach a perfection of taste which ntry has since surpassed. There are many other very valuable speci- f ancient art in the Munich collection, particularly the Barbarini faun.

Arabesque from the Room of the Gods in the Glyptothek.

One room is devoted to the works of modern sculptors; and this contains, among other celebrated works, the Paris of Canova, and the Adonis of Thorwaldsen. The ranges of galleries, forming the two sides of the square, are joined by two splendid banqueting halls, which are highly ornamented by designs in fresco, from classical subjects, by Cornelius, one of the best of the Bavarian painters.—One of the most remarkable features of this building is the system of ornament which has been adopted by the Baron Klenze. Hitherto it has appeared to be the object of the architects of galleries, that the walls and decorations should be plain and subdued, so as not to interfere with the objects exhibited. M. Klenze, however, conceived that this was an error, and has enriched his rooms with splendid decorations, both of colored arabesques, and gilt and stuccoed ornaments in relief, each room partaking of the style of the school to which it is appropriated, and being ornamented by some admirable bassorelievoes, designed and executed by Schwanthaler, the celebrated German sculptor. The experiment by all must be considered as successful; and the objects of art receive increased interest from the ornaments and the harmonious coloring by which they are surrounded, and, as precious things, seem, as it were, enshrined in a beautiful casket.

The labor and genius which have been employed in the designing the ornaments and decorations of this splendid building, have had the effect of introducing a new style of decoration, which has already shown itself in the private houses and manufactures at Munich.

The Pinacothek.—Although the private collection of sculpture of the king of Bavaria is very rich

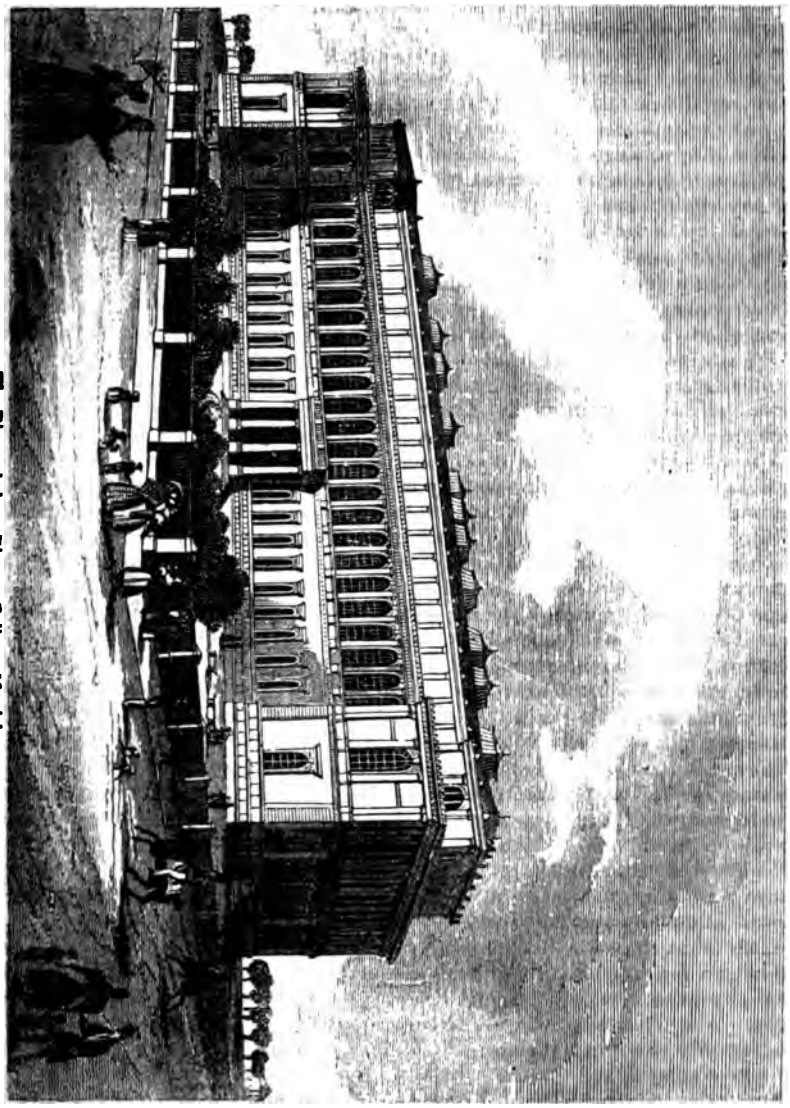


The Glyptothek, or Sculpture Gallery, Munich.

and valuable, it is in pictures that he is able to rival the finest galleries of Europe. He possesses the pictures of the celebrated gallery at Dusseldorf, the various collections at Manheim, Deuxponts, Heidelberg, and Ratisbon: and, moreover, the interesting Boisserie gallery, collected by the two brothers of that name, who were for a long time employed in making selections from various convents, and other public building and private collections, of the productions of the early painters of Germany. This collection, with a vast number of other pictures, is kept for the present in a building undertaken by the king, called the Pinacothek, and is upon a grand scale: Baron Klenze is the architect.

The first stone of the Pinacothek was laid on the 7th of April, 1826 (the birthday of Raphael), by the king. The different saloons have been planned and arranged with peculiar reference to the principal pictures which are to be placed in them; and the whole building is capacious enough to contain about sixteen hundred of the best pictures to be selected from the Dusseldorf gallery, the Boisserie collection, and the various other collections of the king. The same plan, as regards ornament, adopted in the Glyptothek has been followed here; the ceilings of different rooms are enriched with splendid gilt and white ornaments, and with medallions and portraits of the most celebrated painters, all designed by the Baron Klenze, and executed by some of the first artists at Munich. The floors and the dados round each room are of different colored Bavarian marbles, and the walls are to be hung with rich silk, the colors of which are to be selected, as far as possible, to suit the different pictures to be placed there. The former are to be so dispersed as to form part of the architectural ornaments of the rooms, thus giving the whole the appearance of one uniform design. The gallery is an oblong edifice, with two wings at the extremities. The body of the building is of brick; the balustrades, entablatures, and windows, are of stone. It is intended to place the building in the centre of a fine public garden. It consists of an upper and lower story: the ground-floor is to be appropriated to the collection of the Etruscan vases and Mosaics, the king's fine cabinet of drawings by the ancient masters, and the collection of engravings, which is said to be one of the richest in Europe; a library of works relating to the fine arts, an entrance-hall, and accommodations for the students and offices of the establishment. It is the upper floor which is to contain the pictures: this consists of a reception-room, and along the front of the building runs a corridor, about four hundred feet in length, and eighteen in width, lighted by twenty-five lofty arched windows, having on the other side ten doors opening into the seven halls for containing the larger pictures of the collection; on the north side of these seven halls are twenty-three cabinets, in which are to be placed the smaller pictures of the different schools, to which the adjoining halls are appropriated, all lighted from the north. The centre halls, which are about fifty feet in height, are lighted by lanterns from the top. From the windows of the long corridor to the south a splendid view is afforded of the fine range of the Tyrolean Alps. The whole of this corridor, which does not contain any ancient picture, is painted in fresco, in imitation of the Loggie of the Vatican by Raphael. The cupolas over each window contain scenes from the lives of the most distinguished painters, chronologically arranged, thus forming a graphic history of painting, an appropriate accompaniment to a gallery of pictures.

It is from this corridor that the visiter to the gallery may enter through any one of the doors at once into the particular school which he wishes to inspect, without first passing through the whole range, and having his mind distracted by a multiplicity of objects or his eyes dazzled and fatigued.



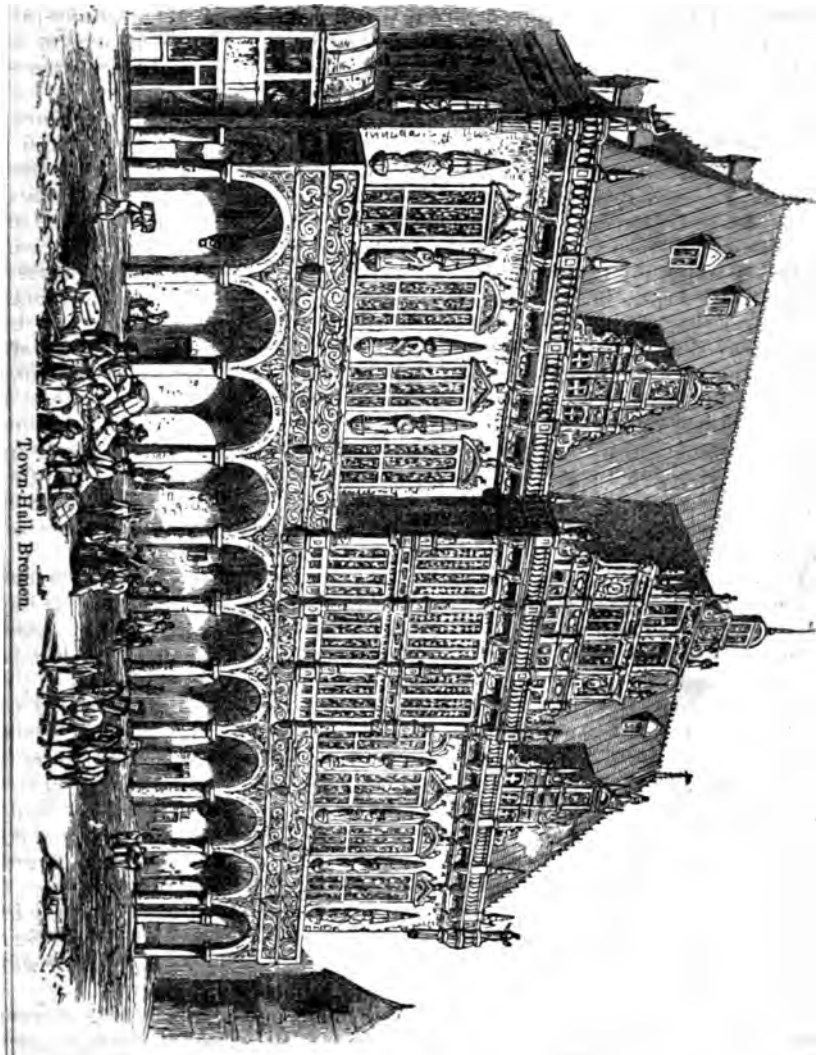
The Pinacothek, or Picture-Gallery, Munich.

There is one other point which should be particularly mentioned with regard to the picture gallery, which is the extreme care which has been taken by Baron Klenze, assisted by other scientific persons at Munich, with regard to the arrangement of the lanterns by which the centre halls are lighted. These are so managed that the light is uniformly distributed over the four sides of the hall, so that on looking at the corner it is impossible to distinguish the line of junction of the angles; and between the darkest and the lightest part of the walls not above two or three degrees of difference are perceptible. Both the statue gallery and the picture gallery, as well as all other repertories of art belonging to the king, are freely open to the inspection of the public on stated days.

Bremen, on the Weser, is one of the oldest Hanseatic towns whose history is connected with the commerce of that period of the middle ages when a solitary vessel scarcely dared yet to venture on the unprotected seas; for after the Vikingr or sea-kings had ceased to carry dismay on every coast, the peaceful mariner was harassed by their piratical successors, who, although conducting their plundering operations on a smaller scale, were scarcely less injurious to the rising interests of commerce. The Hanseatic league was a confederation of towns interested in maintaining a safe intercourse by sea, and from the period of its formation, at the end of the twelfth or the beginning of the thirteenth century, the piracies and disorders which it was intended to suppress gradually diminished. The prosperity of most of the old commercial towns on the continent dates from about this period.

Toward the close of the eighth century, Bremen was made a bishop's see by Charlemagne, and subsequently it was incorporated with the archbishopric of Hamburgh; but this led to a series of contests between the chapters of the two towns, which only terminated by Bremen being made the seat of the archbishopric. Bremen prospered under the government of its ecclesiastical rulers, who favored its union with the Hanse towns, though, at a subsequent period, they opposed its recognition as a free town of the holy Roman empire, a privilege which, however, it afterward obtained. By the treaty of Westphalia, Bremen came into the hands of the Swedes, who converted the archbishopric into a secular duchy. In 1712, it became a conquest of Denmark, and was sold by that state to the electorate of Brunswick. It was not until 1731, when the adjustment of some disputes with the dukes of Brunswick took place, that Bremen again enjoyed its former freedom; which was again subverted by the French, who, in 1810, made it the capital of a department of the French empire. It owed its restoration to independence to the battle of Leipzig and the downfall of Napoleon, and under the treaty of Vienna, Bremen, with sixty-seven square miles of adjoining territory, became a member of the Germanic confederation, and one of the three Hanse towns, Hamburg and Lübeck being the other two.

The Weser divides Bremen into two unequal portions; the old town, with its large suburbs containing handsome mansions and villas, being on the right bank, and the new town, begun in 1625, being on the left, without any suburbs. The narrowness of the streets and the lofty houses, give a gloomy appearance to the more ancient part of Bremen, though it also contains some spacious streets, and in the new town they are generally wide and straight. Cemeteries have been formed outside the town, and the deserted churchyards, no longer employed as burial-grounds, allow of a freer circulation of air, and as these are almost the only open spaces of any magnitude in the old town, they render it more healthy. The ramparts, as we frequently find in old towns on the continent, have been razed and converted into agreeable promenades. The quays on each side of the river afford a good view of the town. Bremen



Town-Hall, Bremen.

contains about 5,900 houses, and 1,100 granaries, manufactories, warehouses, mills, &c. The population of the town amounts to rather more than 41,000, five sevenths of whom are Lutherans, and there are 14,000 persons belonging to the reformed church, 1,500 Roman catholics, and about 1,100 Jews. Individuals are admissible to public offices without reference to their religious creed. The cathedral, built in the twelfth century, and the church of St. Augarius, with its handsome spire, three hundred and twenty-four feet high, are the only ecclesiastical edifices possessing much interest. The archiepiscopal palace has been converted into a town-hall. This circumstance, as well as the razing of the ramparts, is an indication of the important changes which public feeling has undergone in the course of centuries. The town-hall, a view of which is given in the engraving, has been completely renovated within the last few years, and the piazzas have been opened to the public. Here is the former town-hall, built in 1405, below which are the large wine-cellars. We may form some notion of the heartiness of burgher hospitality in the olden times, from the capacity of these cellars, but the pleasures of the table and a spirit of jovial conviviality, were, at that period, the chief excitements which the state of society afforded. Wines of the vintage of 1624 are, or were lately, to be found in the town-hall cellars; and in one cellar there are a dozen vats called the Twelve Apostles, which contained hochheimer and rüdesheimer made early in the last century. There are apartments running down one side of the vaults for the convenience of regaling parties. The exchange combines accommodation for men of business and pleasure, a large concert-room and ball-rooms being under its roof. In the museum, erected in 1801, there are an extensive library, and collections in natural history and the arts. The two gymnasia and the high school, the theatre, arsenal, weighing-house, and Dr. Olbers's observatory, from which he discovered Pallas and Vesta, are the most prominent public edifices of Bremen.

The territory of the free Hanseatic state of Bremen, consists chiefly of marsh land intersected by many water-courses and canals, and, besides the Weser, by one or two small rivers. Agricultural industry is chiefly directed to the breeding of cattle, which are of a superior kind, and little corn is grown except in a few elevated places. In addition to Bremen, this little state comprises two other towns and fifty-eight villages and hamlets. The government is vested in a senate and in the "convention of burgesses," which consists of citizens paying a certain amount of taxes. The senate chooses its members by ballot, out of a certain number of candidates selected by the burgesses. They are elected for life, and exercise all executive functions, administering justice, regulating the police, licensing the ministers of religion, and controlling public instruction; and in their executive capacity they are responsible ministers. The convention, conjointly with the senate, determine the amount and application of the public revenue, and matters relating to commerce and navigation are more immediately under the control of the former body. The debt of the state exceeds $3,000,000, and the annual revenue amounts to about $600,000.

Manufactures of woollens, hats, tobacco, refined sugar, rape oil, soap, starch, cables, ropes, cotton yarn, cottons, and silks, are carried on at Bremen; and there are also tanneries, flour-mills, breweries, and distilleries. It has in addition, a very extensive trade, both with foreign parts and the interior of Germany, being the emporium for the countries watered by the Weser. It is the seaport of the most considerable portion of the kingdom of Hanover, and of Brunswick and Hesse: the Elbe and the Weser are connected by a navigable canal. The principal imports in 1832 were 31,000,000 lbs. of to-

bacco, 29,000,000 lbs. of sugar, 14,000,000 lbs. of coffee, 39,000 tuns of south-sea whale oil, and 33,000 hogsheads and pipes of wine. These are warehoused at Bremen, and afterward distributed for consumption. The returns from the interior consist of lead, copper, iron-wire, glass, grain and potatoes, oak and fir timber, bark, drugs, hemp and flax, wool, rags, paper, linens, and other raw and manufactured articles. Only vessels drawing seven feet water can come up to the town. Vessels of the largest size stop at Braake, an Oldenburgh port, and their cargoes are put into boats and lighters and brought to Bremen. Smaller vessels can come up as far as Bergerac, a port within the state of Bremen. The number of vessels which cleared inward at Bremen in 1832, was, 1,116, of which 123 were from the United States; and in 1835, the arrivals were 1,085. The commercial interests of Bremen are represented by a body called the college of elders, which is possessed of great powers in questions relating to trade and navigation, being in many respects independent of the executive.

St. Stephen's Church.—The city of Vienna, the capital of the empire of Austria, is inferior in extent to most of the other European capitals—the circumference of what is properly called the town being only about three miles. This is the whole that is surrounded by the ancient walls. The suburbs, indeed, which were also walled round in the latter part of the last century, spread to a considerable distance beyond these limits; but of the space which they cover, a very large portion consists merely of gardens and open fields. Although the whole space occupied by the town and the suburbs is about equal in extent to Paris, the population probably does not exceed three hundred thousand, or little more than a third of that of the French capital. In ancient times, however, its dimensions were much more contracted; for the cathedral of St. Stephen, which is now nearly in the heart of the city, is stated to have been originally built without the walls. This is one of the most magnificent monuments of Gothic architecture which now exist. It is three hundred and forty feet in length, by two hundred and twenty in breadth, and eighty in height; but its most remarkable feature is its tower, terminating in a pyramidical spire, the height of which is said to be four hundred and thirty, or according to some authorities four hundred and sixty feet. It rises far above everything else in the city. A staircase conducts to the summit, the number of steps in which is seven hundred; and the view thence, over the extensive and richly-cultivated plain in the midst of which Vienna stands, is described as being one of the finest in the world. This lofty and beautiful tower (for the richness of its architecture equals its surprising elevation) rises from the south side of the church. A similar tower on the opposite side of the church is supposed to have been intended in the original design; and the popular tradition is, that after it had been carried as high as the roof of the church, the builder was thrown from a window and killed by the person who had built the former, and who took this way of preventing his own erection from being equalled or surpassed by his rival. A sculpture in marble, which stands under the pulpit, of a man looking out from a window, is pointed to as the record and evidence of this event; but it is more probable that the story has been made for the sculpture than that the sculpture refers to the story.

Even the bitterest enemies, both of the Austrian power and of the Christian faith itself, have been won to admiration by the beauty of the tower of St. Stephen's. As in ancient times at the destruction of Thebes,

> "The great Emathian conqueror bid spare
> The house of Pindarus, when temple and tower
> Went to the ground;"

so the Turkish sultan, Soliman II., when he besieged Vienna, in 1529, gave orders that the cannoniers should carefully avoid touching with their shot this noble spire. In acknowledgment of the sultan's generosity, it was ordered that the crescent and star, the Ottoman arms should be engraved on one of the highest pinnacles; and there, accordingly, they were to be seen till the last siege in 1683, when Kara Mustapha, by whom the bombardment was carried on, not having observed the same forbearance, they were obliterated. It was on this latter occasion, when the Turkish army, consisted of two hundred thousand men, after having continued the attack for twenty-three days, and brought the city to the brink of surrender, was suddenly fallen upon and cut to pieces by a much smaller force under the command of the great John Sobieski, that a bell was cast for the tower of St. Stephen's, from the cannon that were captured. The bell contains above eighteen tons of metal, and is ten feet in height, and thirty-two in circumference.

The first church which occupied the site of the present St. Stephen's was erected by Duke Henry I., in 1144; but after having been twice burnt down, the edifice was entirely rebuilt in 1270. It was originally dedicated to all the saints; and was not made a cathedral till after the middle of the fourteenth century. About the same time it was repaired and greatly enlarged by Rodolphus IV. The tower, however, is of still later date; all that part, at least, which is above the walls, having certainly been erected since 1400. The Dukes Abert III. and IV., have the credit of commencing and completing it.

The whole of the cathredral, which is built of freestone, is richly decorated, both externally and in its interior, with figures and other ornamental chiselling in the favorite style of the times in which it was erected. The inside is also adorned by between thirty and forty altars, all of marble, among which the high altar is remarkably splendid. To these are to be added numerous monuments or mausoleums. That of the emperor Frederic III., is said to have cost forty thousand ducats. Another of great sumptuousness is that of the famous prince Eugene of Savoy. It was only completed in 1759.

Strasburg Cathedral.—The architecture of the middle ages has left us nothing greater or more wonderful than the cathedral of Strasburg. The engraving represents it as seen from the west, with its splendid spire, unrivalled in beauty as it is in height—springing up, it may almost be said, till it disappears in the clouds. It is impossible to gaze on the far-ascending column, with its tier on tier of sculptured masonry piled in endless succession, without feeling the spirit drawn up along with it toward a higher world. There, too, it has stood unchanged for upward of five hundred years, looking down upon all things else, constantly in motion and passing away, as if it alone, though resting on the mutable earth, were not of it, but as enduring as the heaven it points to. By all its associations it calls us out of and away from this present time. It is the representative of the future and it is also the monument of the past—the surviving witness in its venerable antiquity, of a long procession of revolutions and grand events which stir or dazzle men now only in the pictures of history.

The greater portion of the cathedral of Strasburg is still older than the spire; and part of it dates almost from the dawn of modern civilization. Tradition asserts that, before the country was subdued by the Roman arms, the Celts worshipped their divinity Esus, the god of war, under a tree which grew upon the spot where the cathedral now stands. This sacred tree the Romans are said to have cut down, and in its stead to have erected a temple, where the inhabitants paid their devotions to the German Hercules, whom they called Kruzmanna, the same word with the modern German Kriegeman,

St. Stephen's Church, Vienna.

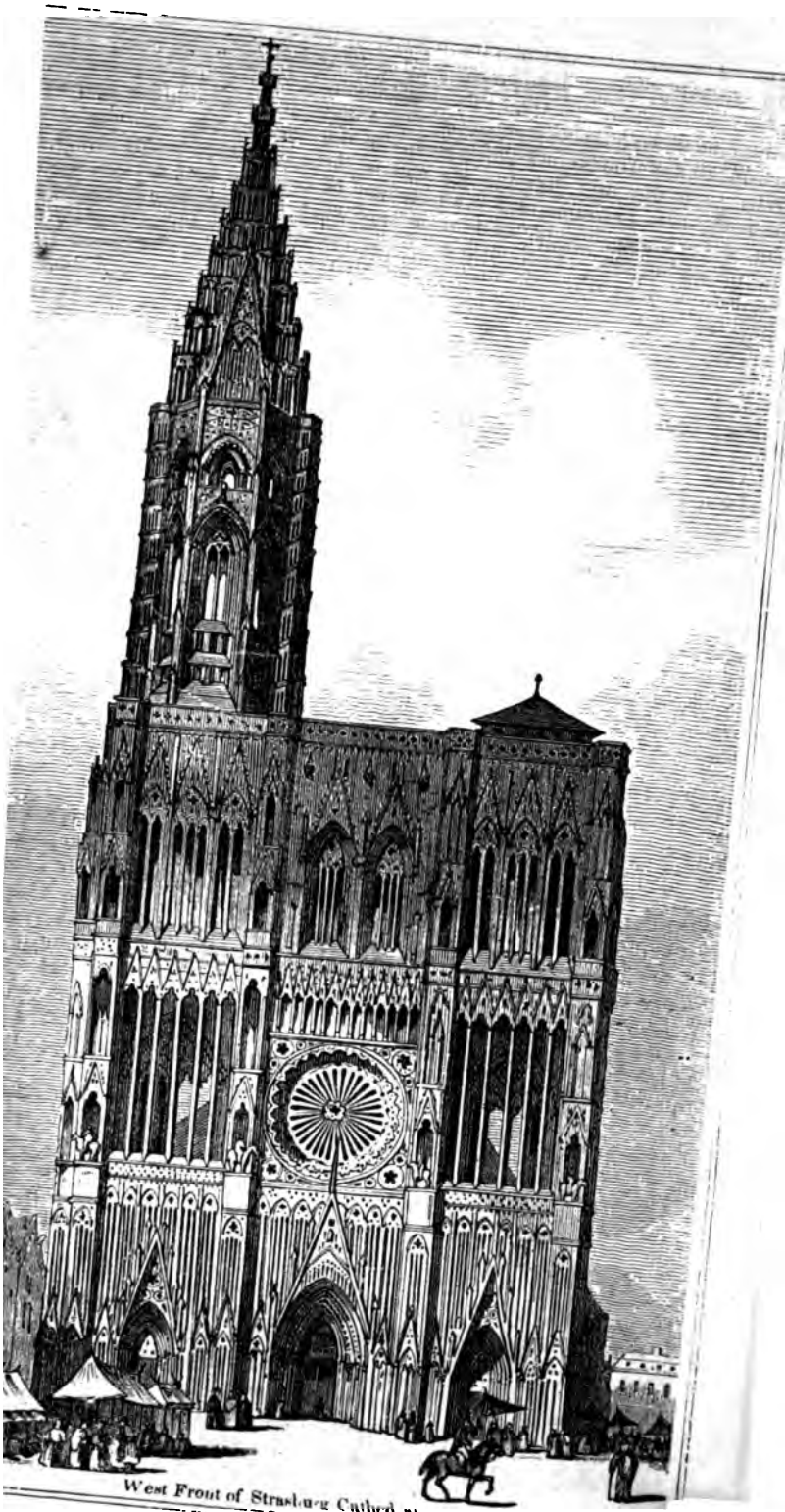
or warrior. The old ecclesiastical chronicles relate, that the first Christian church built on the spot was erected by St. Amand, the first bishop of the Alsatians, about the middle of the fourth century. After it had stood a hundred years, it was destroyed by Attila and his Huns. From the time of the devastation of these barbarians, the place remained desolate and uninhabited till it was restored, in the commencement of the sixth century, by Clovis, king of the Franks, who also rebuilt the church, as was the fashion in those times, of wood. It was now that Strasburg received its present name, which signifies the town of the street, having been called Argentoratum, by the Romans.

The present cathedral was begun about the middle of the eighth century by the French king Pepin le Bref, and finished by his son and successor Charlemagne. The walls of the choir still remain as they were completed by these two monarchs in that remote age. The rest of the ancient cathedral was destroyed in the war which followed the death of the emperor Otho III., in the year 1002. Their restoration was commenced in 1015, by the bishop Werinhaire, or Werner, by whom the work was continued with great spirit till his death, in 1028, above a hundred thousand persons, it is stated, having been all that time employed, numbers of whom came from foreign countries. The wages of many of them were paid merely in pardons and indulgences. After Werner's death, however, the zeal with which the pious undertaking was prosecuted waxed faint, and the body of the church was not completed till the year 1275, being a space of two hundred and sixty years from the date of its commencement.

It still, however, wanted the crowning ornament and distinction of a Christian temple, a tower or spire: that addition immediate preparations were made to supply. On the twenty-fifth of May, 1277, the first stone of the present spire was laid by the bishop, Conrad de Lichtenberg. The designer and master builder was Ervin de Steinbach, who, by this creation of his genius, has shown himself to have been one of the greatest architects that ever existed. His design, however, as appears from the original still preserved in the cathedral, differed from the one which has been actually executed, inasmuch as it embraced the erection of two spires, one over each extremity of the western façade, whereas only that to the north has been erected. Ervin de Steinbach died in 1318, and was succeeded as master-builder by his son John, who superintended the work till his death, in 1339. The spire was not finished till 1438, having thus been the work of a hundred and sixty-one years. The architect who brought the work to a conclusion was John Hülz, who survived to enjoy the reputation which it brought him till 1449.

Very different accounts have been given of the height of the spire of Strasburg cathedral: some so extravagant that they have extended it to twice what it actually is. According to a work entitled "Description de la Cathédral de Strasbourg," printed in that city in 1817, being an enlarged and corrected edition of a former publication, by a writer of the name of François Miles, the most accurate measurement makes it about four hundred and ninety-four feet high, being within thirty feet of the height of the largest of the Egyptian pyramids. It is said that in Ervin de Steinbach's original design, each of the two towers which he proposed to erect is raised a hundred feet beyond this height.

The single spire which the building possesses rises, as has been mentioned, from the northern end of the west front, and surmounts one of the three great doors by which that façade is pierced. Besides its unsurpassed elevation, the structure has all the other characters of a perfect work. Nothing can be con-



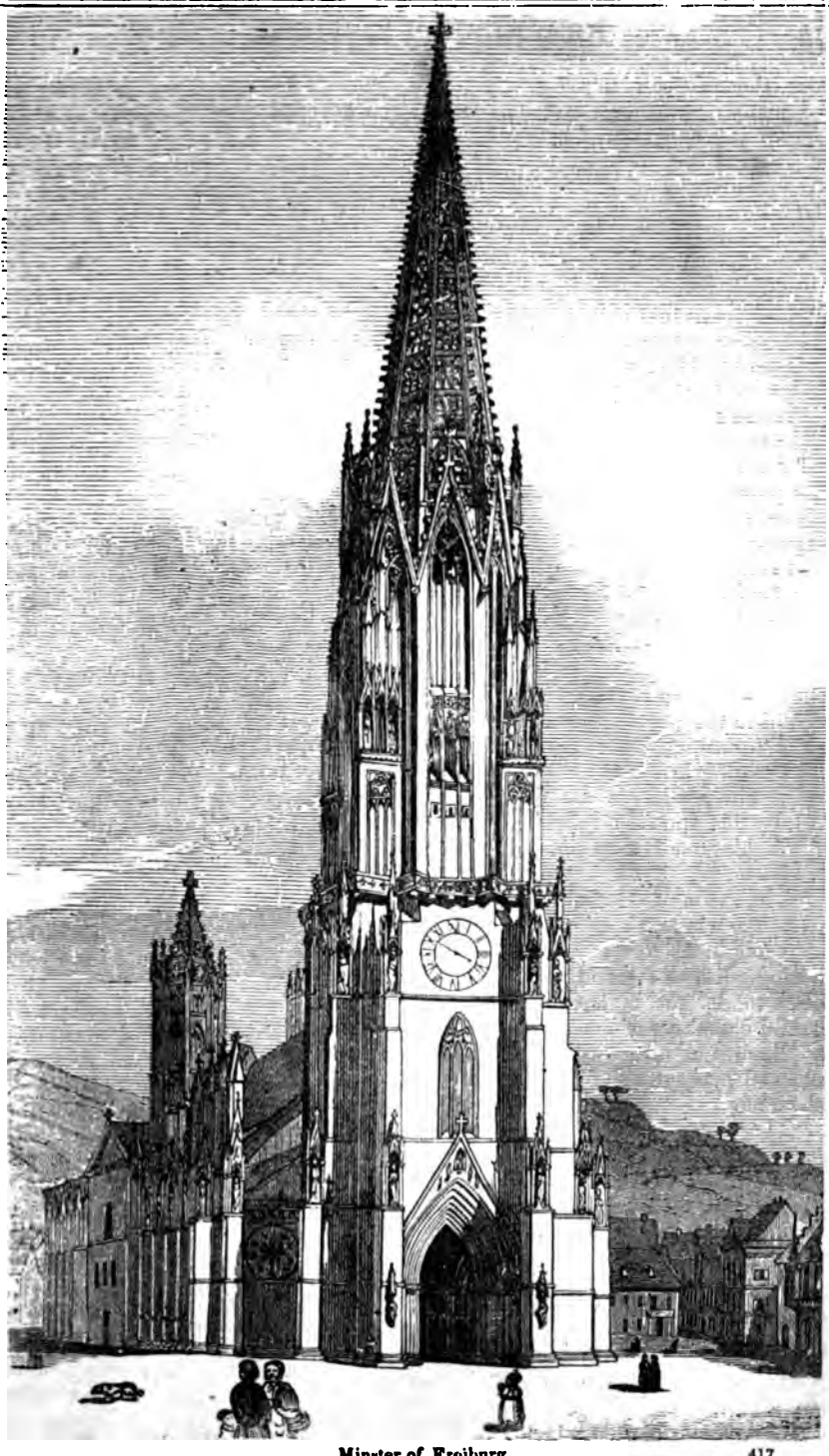
West Front of Strasburg Cathedral

ceived more wonderful than the consummate art by which the architect has combined the greatest strength with the most admirable lightness and airiness. The masonry does not present to the eye a solid mass, but is almost from the base to the summit a succession of columns and arches with openings between, springing up as if, instead of being supported by, they grew out of each other. The outline of the whole, at the same time, is one of faultless beauty, while the ornamental sculpturing throughout is so rich and delicate that its appearance has been usually compared to that of lace. "The ancient architects," says the French writer Laugier, in his "Essai sur l'Architecture," "excelled in the construction of spires. They seized in a marvellous manner the spirit of that sort of work, and carried to the utmost length the artifices upon which it depends. They possessed the secret of uniting in their erections lightness and delicacy of workmanship to elegance of form; and, avoiding equally the over-attenuated and the over-massive, they attained the precise point in which consists the true beauty of this description of building. Nothing of this kind is to be compared to the spire of the cathedral of Strasburg. This superb pyramid is a masterpiece of skill, ravishing our senses at once by its prodigious elevation, the exactness of its gradual diminution, its pleasing shape, the justness of its proportion, and the exquisite finish of its workmanship. I do not believe that any architect ever produced a work so boldly imagined, so felicitously conceived, and so admirably executed. There is more art and genius in this one performance than in all else that we have most wonderful in architecture."

The cathedral of Strasburg stands in what is called the Place du Dôme, which is the highest ground in the city; and a tolerably complete view of the east end may be obtained from the square. The surrounding houses press rather close upon it in other parts; and indeed the north and south sides are hidden for nearly their whole length by rows of shops, which were only in the latter part of the last century detached from the very walls of the sacred edifice. It consists of a nave and choir, without a transept, the breadth, however, being enlarged at the choir by the contiguity of several chapels dedicated to particular saints, and other apartments. The length of the interior from east to west is about three hundred and fifty-five feet; the breadth of the nave one hundred and thirty-two; and its height seventy-two. The choir, which is as usual separated from the nave by a screen, is also raised about twelve or fifteen feet above it. The nave is separated from its side aisles by two rows of nine pillars each, which are so massive that the largest is seventy-two feet in circumference. The windows which range along the north and south walls are filled with painted glass; and over the middle or principal entrance in the west end there is what is called a rose-window of forty-eight feet in diameter, of exquisite richness and beauty. The magnificence of the interior of the church is further increased by many noble paintings, the productions of some of the greatest of the old masters, which cover the walls.

One of the wonders of this cathedral is its famous clock; a full description of which will be found in our chapter on ingenious mechanism, page 367.

Freiburg is a town which was formerly the capital of the mountainous and woody district of Brisgau, and now the chief place of the circle of Treisam in the grand-duchy of Baden. It is situated on the right bank of the river Treisam, at the foot of a mountain, at the entrance of the Black forest by the great road leading from the Rhine. The town is not of high antiquity. It was originally a village occupied by the workmen in the neighboring mines, the produce of which furnished the means for the foundation of the city and the erection of the churches and monasteries by which it is still adorned. As a city, it was founded in the year 1120, by Berchtold III., duke of Zaringen,



Minster of Freiburg. 417

from whose descendants it passed to the counts of Fürstenberg, with whom it had many disputes on account of its privileges. Much bad feeling was in consequence engendered between the parties, and blood was shed in the quarrel; but, at last, Count Egon was induced (in the year 1386) to come to an arrangement, by which, for the consideration of twenty thousand marks of silver, he conceded to the town the freedom it desired, and transferred his reserved rights, as we understand this rather complicated transaction, to his cousin the prince of Austria, by whom the above sum was advanced. The town was thenceforth called Freiburg or Freetown. In the course of its history, we learn that it was strongly fortified, and stood repeated sieges before 1744, when it was taken and dismantled by the French. It was again taken by them in 1796; and was ultimately, with the district of Brisgau, ceded to Baden by Austria, at the peace of Presburg, in 1805.

Freiburg is described as a very lively and open city. The streets are wide, well paved, and traversed by streams of clear water; the houses are good, and the town is well furnished with fountains, hotels, and public buildings. The population is at present about ten thousand.

The minster of Freiburg, which is represented in our engraving, is a very magnificent structure. The tower is much admired as one of the finest and most complete Gothic steeples extant. It is no less remarkable for its height than for its beautiful figure and fine workmanship—the structure being from the foundation to the summit composed of ornamented and sculptured stones. Its elevation is variously stated, some accounts representing it to be five hundred and thirteen feet—which is nineteen feet higher than that of Strasburg. We have not been able to learn the precise date of its erection.

Within the walls of the fine old church of Stratford-on-Avon, represented in the accompanying engraving, lie the ashes of SHAKSPERE. In a small house still standing in the same town, was the great poet born. We may best convey to our readers some impression of the interest which we have felt in visiting this spot, by reprinting some passages from "The Sketch-Book" of Washington Irving, one of our most pleasing and accomplished writers:—

"I had came to Stratford on a poetical pilgrimage. My first visit was to the house where Shakspere was born, and where, according to tradition, he was brought up to his father's craft of wool-combing. It is a small, mean-looking edifice of wood and plaster, a true nestling-place of genius, which seems to delight in hatching its offspring in by-corners. The walls of its squalid chambers are covered with names and inscriptions, in every language, by pilgrims of all nations, ranks, and conditions, from the prince to the peasant; and present a simple but striking instance of the spontaneous and universal homage of mankind to the great poet of nature.

"The house is shown by a garrulous old lady, in a frosty red face, lighted up by a cold blue anxious eye, and garnished with artificial locks of flaxen hair, curling from under an exceedingly dirty cap. She was peculiarly assiduous in exhibiting the relics with which this, like all other celebrated shrines, abounds. There was the shattered stock of the very matchlock with which Shakspere shot the deer, on his poaching exploit. There, too, was his tobacco-box, which proves that he was a rival smoker of Sir Walter Raleigh; the sword also with which he played Hamlet; and the identical lantern with which Friar Laurence discovered Romeo and Juliet at the tomb! There was an ample supply also of Shakspere's mulberry-tree, which seems to have as extraordinary powers of self-multiplication as the wood of the true cross. of which there is enough extant to build a ship-of-the-line."

Since the visit of Mr. Irving to Stratford, the inscriptions on the walls of

Parish Church of Stratford-on-Avon.

hakspere's house have been obliterated. We can no longer hunt out the andwriting of Garrick or Byron amid the crowd of Smiths and Whites whom ıriosity had brought hither. The ancient tenant of the house, the keeper f the Shaksperian relics described above, being ejected from the premises hich she had so long occupied with profit, in a fit of wrath had the sacred alls smeared over with whitewash the night before she quitted them. The ld lady had moved with her heap of relics to a house on the opposite side f the way when we visited Stratford about seven years ago. But the knowlıge of her malicious outrage prevented us looking on her trumpery with ıy patience. We had ceased to have any faith in these matters. We reısed to sit in her Shakspere's chair, affirming, to her great mortification, that ıe real chair had been sold to the emperess of Russia; and, worst of all, we efused to purchase her own play of the battle of Waterloo. Poor woman! ıe claimed to be a lineal descendant from the poet, and, to prove her claim ı the inheritance of his genius, wrote the most execrable verses that folly ver produced. We could have forgiven her bad verses, had some of Shakpere's good humor and kindness of heart descended to her. But she whiteashed out all the names, noble and ignoble, of the sacred chamber, to spite

her successor! Her play and her plaster doubly destroyed all belief in her pedigree! We should add, that the exterior of Shakspere's house has been much altered within the last forty years. The annexed engraving exhibits it as it appeared in 1788.

Shakspere's House as it appeared in 1788.

We proceed with Mr. Irving's agreeable narrative:—

"From the birthplace of Shakspere a few paces brought me to his grave. —He lies buried in the chancel of the parish-church, a large and venerable pile, mouldering with age, but richly ornamented. It stands on the banks of the Avon, on an embowered point, and separated by adjoining gardens from the suburbs of the town. Its situation is quiet and retired; the river runs murmuring at the foot of the churchyard, and the elms which grow upon its banks droop their branches into its clear bosom. An avenue of limes, the boughs of which are curiously interlaced, so as to form in summer an arched way of foliage, leads up from the gate of the yard to the church-porch. The graves are overgrown with grass; the gray tombstones, some of them nearly sunk into the earth, are half covered with moss, which has likewise tinted the reverend old building. Small birds have built their nests among the cornices and fissures of the walls, and keep up a continual flutter and chirping; and rooks are sailing and cawing about its lofty gray spire.

"We approached the church through the avenue of limes, and entered by a Gothic porch, highly ornamented, with carved doors of massive oak. The interior is spacious, and the architecture and embellishments superior to those of most country churches. There are several ancient monuments of nobility and gentry, over some of which hang funeral escutcheons, and banners dropping piecemeal from the walls. The tomb of Shakspere is in the chancel. The place is solemn and sepulchral. Tall elms wave before the pointed windows, and the Avon, which runs at a short distance from the walls, keeps up a low perpetual murmur. A flat stone marks the spot where the bard is buried. There are four lines inscribed on it, said to have been written by himself, and which have in them something extremely awful. If they are indeed his own, they show that solicitude about the quiet of the grave which seems natural to fine sensibilities and thoughtful minds:—

"'Good friend, for Jesus' sake, forbeare
To dig the dust enclosed here.
Blest be he that spares these stones,
And curst be he that moves my bones'

"Just over the grave, in a niche of the wall, is a bust of Shakspere, put up shortly after his death, and considered as a resemblance. The aspect is pleasant and serene, with a finely-arched forehead; and I thought I could read in it clear indications of that cheerful, social disposition, by which he was as much characterized among his contemporaries as by the vastness of his genius. The inscription mentions his age at the time of his decease—fifty-three

years;—an untimely death for the world: for what fruit might not have been expected from the golden autumn of such a mind, sheltered as it was from the stormy vicissitudes of life, and flourishing in the sunshine of popular and royal favor!

"The inscription on the tombstone has not been without its effect. It has prevented the removal of his remains from the bosom of his native place to Westminster Abbey, which was at one time contemplated. A few years since, also, as some laborers were digging to make an adjoining vault, the earth caved in, so as to leave a vacant space almost like an arch, through which one might have reached into his grave. No one, however, presumed to meddle with his remains, so awfully guarded by a malediction; and lest any of the idle or the curious, or any collector of relics, should be tempted to commit depredations, the old sexton kept watch over the place for two days, until the vault was finished, and the aperture closed again. He told me that he had made bold to look in at the hole, but could see neither coffin nor bones, nothing but dust. It was something, I thought, to have seen the dust of Shakspere.

Tomb of Shakspere.

Shakspere.

"Next to his grave are those of his wife, his favorite daughter Mrs. Hall, and others of his family. On a tomb close by, also, is a full-length effigy of his old friend John Combe, of usurious memory, on whom he is said to have written a ludicrous epitaph. There are other monuments around, but the mind refuses to dwell on anything that is not connected with Shakspere. His idea pervades the place: the whole pile seems but as his mausoleum. The feelings, no longer checked and thwarted by doubt, here indulge in perfect confidence; other traces of him may be false or dubious, but here

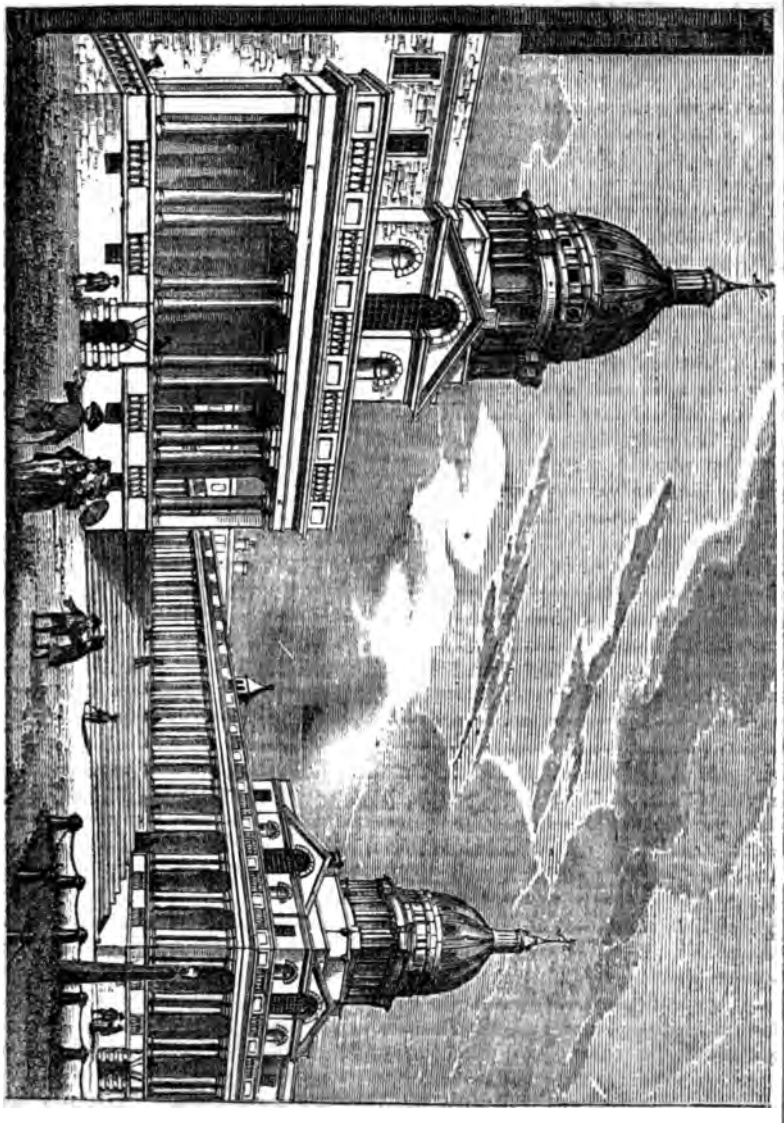
is palpable evidence and absolute certainty. As I trod the sounding pavement, there was something intense and thrilling in the idea that, in very truth the remains of Shakspere were mouldering beneath my feet. It was a long time before I could prevail upon myself to leave the place; and as I passed through the churchyard I plucked a branch from one of the yew-trees, the only relic that I have brought from Stratford."

Mr. Irving's paper continues in a very pretty description of his visit to the old family seat of the Lucys at Charlecot, whose park was the scene of the hairbrained exploits of which Shakspere's boyhood has been accused. Our limits will not allow us to dwell longer on this subject, except to give the concluding paragraph of Mr. Irving's reflections on Stratford-on-Avon:—

"He who has sought renown about the world, and has reaped a full harvest of worldly favor, will find, after all, that there is no love, no admiration, no applause, so sweet to the soul as that which springs up in his native place. It is there that he seeks to be gathered in peace and honor among his kindred and his early friends. And when the weary heart and failing head begin to warn him that the evening of life is drawing on, he turns as fondly as does the infant to the mother's arms, to sink to sleep in the bosom of the scene of his childhood. How would it have cheered the spirit of the youthful bard, when, wandering forth in disgrace upon a doubtful world, he cast back a heavy look upon his paternal home, could he have foreseen that, before many years, he should return to it covered with renown; that his name should become the boast and glory of his native place; that his ashes should be religiously guarded as its most precious treasure; and that its lessening spire, on which his eyes were fixed in tearful contemplation, should one day become the beacon, towering amid the gentle landscape, to guide the literary pilgrim of every nation, to his tomb!"

Greenwich Hospital.—The opposite banks of the Thames could not be more fitly adorned than they are by those two great monuments of the public beneficence, the hospitals of Greenwich and Chelsea. Both these retreats are splendid places; the former, especially, is one of the most magnificent palaces in England; and yet their inmates are, for the most part, merely private soldiers and sailors. It may be said that they are, after all, but the abodes of persons of poor and low degree, and that there is an unsuitableness in giving those a palace to dwell in whose mode of life in other respects is about on a level with that of the inhabitants of cottages. Thus might those argue who looked to the matter with reference only to physical considerations, and could not, or would not, view it in its moral bearings.

The walk to Greenwich is far from being the most attractive of the walks in the environs of London. It is almost a continued street from each of the bridges; and though the road is wide, and the houses occasionally pretty, the holyday-maker may become impatient for the green fields, and weary of the bustle from which he appears unable to escape. The best mode of visiting Greenwich is by water. You may take a boat at London bridge and be landed close to the Royal hospital; and every day, except Sunday, passage-boats are constantly plying at Tower Stairs. The Thames, covered with the vessels of all nations, may fitly prepare the mind for visiting the palace of those veterans who have sailed under the British flag during many a year of tempest and of battle. Now you will pass alongside the hulk of some immense ship, destined to be broken up. . . . . Again, some steam-vessel from Boulogne, or Hamburgh, or the Rhine, will sweep by, heaving the wave all around in its impetuous course; and you may reflect how much nobler are the triumphs of peace than those of war, and that the unbounded commerce of England is a better thing for herself and the world than even her proudest



Royal Hospital, Greenwich.

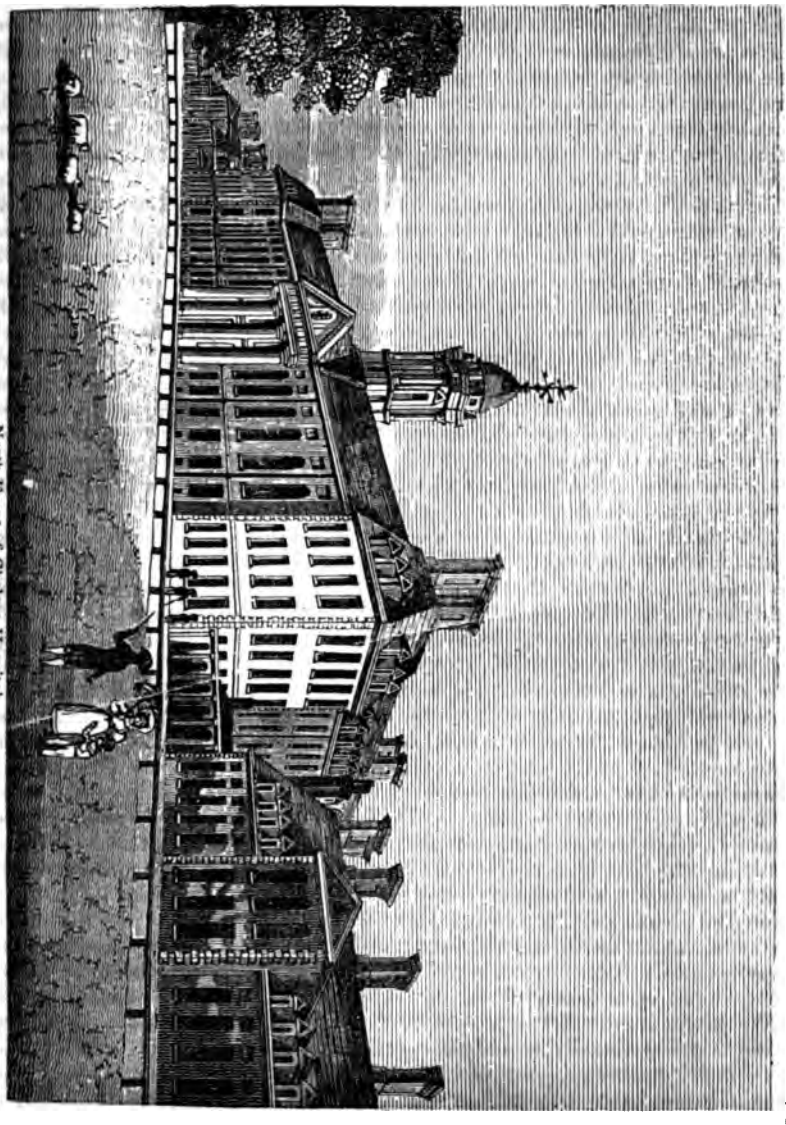
victories. In the meantime, the domes and colonnades of Greenwich will rise from the shore, and impress your mind with a magnificence of which the architecture of England presents but few examples; and you will feel an honest pride when you know that few of the great ones of the earth possess palaces to be compared with the splendor of this pile, which the gratitude of the nation has assigned as the retreat of its wounded and wornout sailors.

The greater part of the buildings of the Royal Hospital of Greenwich is stone; the architecture is of the Roman character, rather plain in its general details, but acquiring great features of magnificence from its large dimensions, from the material of which it is executed, from its porticoes, its splendid domes, and its long colonnades. The whole of the buildings are open to the river. On a fine day, the old pensioners may be seen standing about in groups, or taking a solitary walk in the courts of the hospital, or intent upon some book of devotion or of inspiring adventures. In the beautiful adjoining park they appear to find much delight in rambling; and many of them establish themselves on some green knoll, provided with a telescope, the wonders of which they exhibit to strangers, and point out, with all the talkativeness of age, the remarkable objects which may be seen on every side. The appearance of these veterans—some without a leg or arm, others hobbling from the infirmities of wounds or of years, and all clothed in old-fashioned blue coats and breeches, with cocked hats—would oddly contrast with the splendor of the building which they inhabit, did not the recollection that these men were among the defenders of their country give a dignity to the objects which everywhere present themselves, and make the crutch of the veteran not a discordant association with the grandeur of the fabric in which he finds his final port, after the storms of a life of enterprise and danger.

The habitations of the pensioners are divided into wards, each bearing a name, which has been, or might be, appropriated to a ship. These wards consist of large and airy rooms, on either side of which there are little cabins, in which each man has his bed. If you should obtain permission to go through a ward (which is not usually allowed to strangers), you will see how deeply implanted in the human breast is the love of individual property. Every cabin has some convenience or ornament, the exclusive possession of its tenant; and these little appendages lead one to speculate upon the character of the man to whom they belong. In one may be seen a ballad and a ludicrous print; in another, a christmas carol and a bible. In large communities, and particularly in a collegiate life, men must greatly subdue their personal habits and feelings to the character of their society; but the individuality of the human mind will still predominate, and will display itself in a thousand little particulars, each of which would furnish to the accurate inquirer an increased knowledge of the human heart.

The pensioners mess in common. They assemble for their sabbath devotions in the chapel of the hospital, a modern building, perhaps the most splendid and most tasteful in its decorations of any place of worship in the kingdom. It has not, however, the simplicity and soberness of a temple of the Most High; and the elaborate nature of its ornaments appears particularly unsuited to the character of its congregation. The "Painted Hall," a noble room opposite the chapel, is now a gallery of naval portraits and of sea-fights. It contains some fine pictures, arranged with great taste. The idea was a happy one.

It is said, by those who intimately know the habits of the old pensioners, that they are not generally happy. They are provided with every comfort, they are treated with every kindness, they have no laborious duties imposed upon them; but they have nothing to hope or to fear—they want employment



North Front of Chelsea Hospital.

—they are alone in a crowd—they have no wife or child to partake their pleasures or soothe their pains—they are friendless among multitudes—the heart is desolate in the midst of worldly comfort. These circumstances arise from an essential property of our nature, and no care to make these poor men happy would overcome the undeviating laws of human feeling. Happiness does not wholly depend upon outward circumstances; but if the Greenwich pensioners could be brought impartially to exhibit the degrees of happiness which prevail among them, we should find that he was most happy who was laying by the greater portion of his little pittance for a heart that he loved, and was building up his own happiness by a preparation for eternity; while he was most miserable who was most exempt, in the common acceptation, from care, and who acquired as much passing gratification as his situation could reach.

Chelsea Hospital is a very inferior structure to that of Greenwich as a display of architectural beauty; but it is at least a convenient and neat building, and altogether, with its airy and spacious courts and walks, far from being destitute of imposing effect. The design is said to have been Sir Christopher Wren's. It consists of three courts, two of which are complete quadrangles, while the central one is open on the side next the river. In the part of the building which fronts this opening are a large hall on the one side and a chapel on the other, both of which contain some pictures, though none of any great merit. The chapel is 110 feet in length by 30 in width, and the hall is of the same dimensions. The only other large apartments in the building are some of those forming the lodgings of the governor, which are at the extremity of the eastern wing of the principal court. In the centre of the court stands a bronze statue of Charles II., in a Roman dress.

The wards of the pensioners are sixteen in number, each being 200 feet in length and 12 in breadth, and containing twenty-six beds. They occupy the greater portion of the two wings of the principal court, each of which is 365 feet in length. The officers have small separate apartments. The other two courts contain an infirmary furnished with hot and cold baths, and apartments for the treasurer, chaplain, apothecary, and other functionaries. The regular number of in-pensioners is four hundred and seventy-six, of whom twenty-six are captains, thirty-two sergeants, thirty-two corporals, and the rest privates. But the institution also supports some thousands of out-pensioners.

The ground on which Chelsea hospital now stands, was formerly occupied by a college, founded in 1609 by Dr. Matthew Sutcliffe, dean of Exeter. James I., who took a keen interest in the scheme, granted it a charter in 1610, in which it is declared that it should go under the name of King James's college at Chelsea. This institution had the honor of enrolling among its members Camden, who was nominated its historian, Sir Henry Spelman, Antonius de Dominis, the celebrated archbishop of Spalatro, and many learned divines; but it never arrived at any prosperity. The subscriptions which were solicited for its support could not be obtained; and, although the founder left it a considerable amount of property at his death, in 1629, it was found that only a small part even of this bequest could be recovered. Buildings, however, of considerable extent, had been erected. Soon after the restoration the property appears to have been estreated to the crown, which indeed had frequently before this assumed the power of making use of the place for purposes of its own. For some time it was used as a receptacle for foreign prisoners. At length, in 1669, Charles II. granted it to the newly-incorporated Royal society. They retained possession of it till 1682, when they sold it back to the king for £1,300. The old buildings

were immediately thrown down, and on the 12th of May, in the same year, the first stone of the present fabric was laid by Charles himself, attended by a great number of the principal nobility and gentry. The crown, however, was not at the whole expense of the erection; large contributions to the work were made by several public-spirited individuals. Sir Stephen Fox, the ancestor of the present noble family of that name, gave no less a sum than £13,000. According to tradition the person who first suggested the project was the notorious Nell Gwyn. She, according to the common story, is said to have prevailed upon the king to undertake the work, her compassion for the destitute situation of the disbanded veterans of the army having been strongly excited by one of them coming up one day to the door of her coach, and soliciting charity, with a piteous tale of the wounds he had received in the royal cause. The edifice was not completed till the year 1690, in the reign of William and Mary.

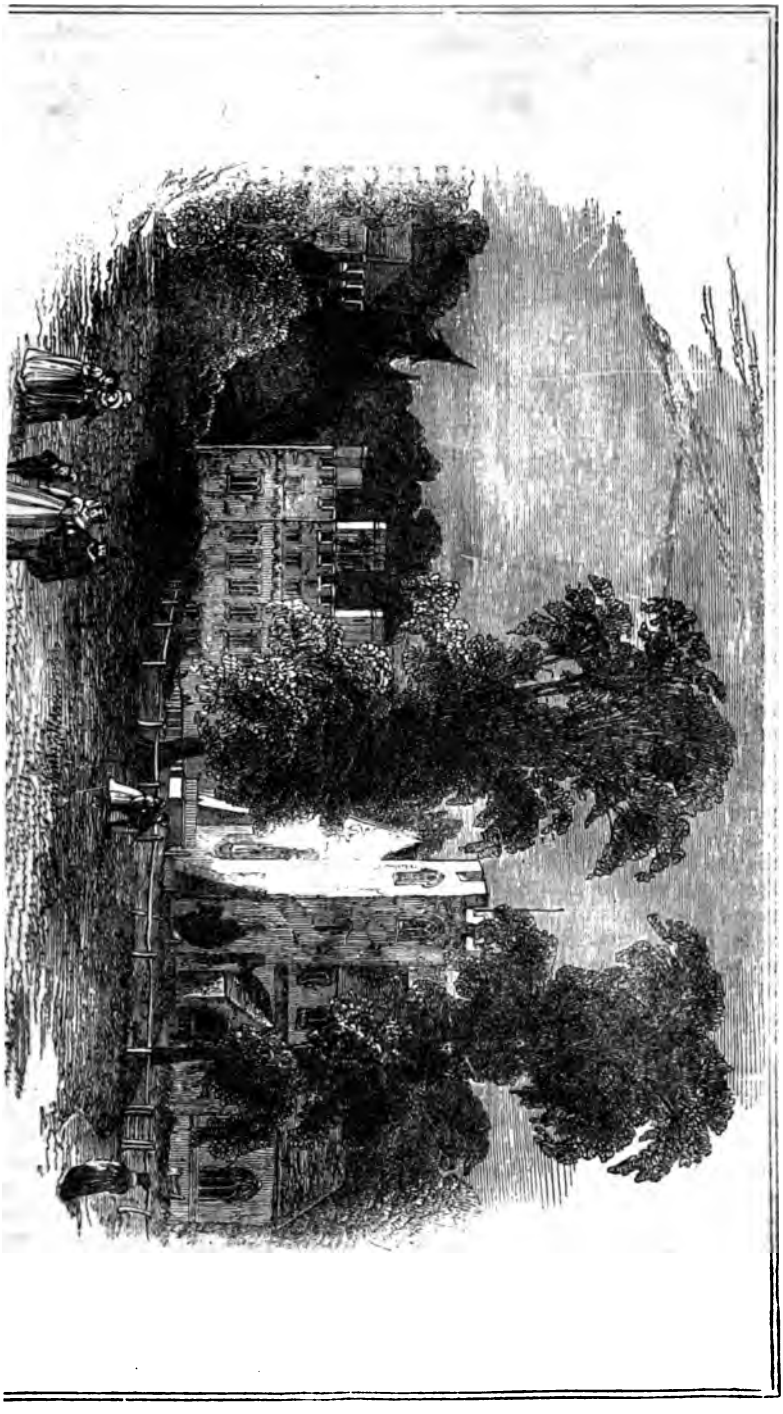
Hampden House and Church.—Hampden house, the manorial residence of the eminent patriot, is in the parish of Great Hampden, in the hundred of Aylesbury, about five miles south of Wendover. The manor was originally granted by Edward the Confessor to the family, the pedigree of which, still preserved in the mansion, exhibits a long unbroken line of lords who succeeded each other in genealogical succession, from the Saxon times down to a comparatively recent period, 1754, when, by the death of John Hampden, a descendant of the patriot, it was extinguished. The Hampdens, therefore, from time immemorial, have been considered as one of the most ancient families of the county. During the reign of Elizabeth, Griffith Hampden, Esq., who had filled the office of high-sheriff of Buckinghamshire, and represented the county in parliament, received the queen at Hampden house, in 1585, with a display of the most magnificent hospitality. Prior to this the house had been much enlarged, and in some parts rebuilt. A single fact which has been preserved in connexion with this visit illustrates the extraordinary efforts made on the occasion. Mr. Hampden caused an extensive avenue to be cut through the woods expressly for her majesty's passage: a part of the opening then made is still to be seen on the brow of the Chiltern hills for many miles round, and, in commemoration of the circumstance we have mentioned, was designated and is still known by the name of the Queen's gap. On the death of the last male descendant, the manor passed into the possession of his cousin, the Rt. Hon. R. Trevor, who took the name of Hampden, and from whom it descended to the present possessor, the earl of Buckinghamshire.

The mansion is situated at some distance from each of the two principal roads which pass through the county, at the back of a chalky range of the Chiltern hills which bounds one side of the vale of Aylesbury. The surrounding scenery is altogether of a very beautiful and picturesque character, though, from its seclusion, little known. From a neighboring ridge there is a fine prospect extending over several counties, and agreeably diversified by dells and the natural luxuriant growth of box, juniper, and beech. The woods of Hampden terminate at the brow of a lofty hill called "Green Haly," on the side of which is a very curious and interesting vestige of antiquity. It is a cross cut in the chalk, of immense size, and consequently visible from great distances in every direction. It is called the "White-leaf cross," and has been supposed by one antiquarian, Mr. Wise, to have been designed in commemoration of a victory gained here in the tenth century by Edmund, king of the west Saxons over the Danes. Lord Nugent, in his memorial of Hampden, however, states that it is much more probable that the cross was intended to commemorate the last battle fought between Hengist and Horsa

with the Britons. The scene of this engagement is the extensive neighboring plain of Risborough and Saunderton. Upon the hill of Green Haly, and on the adjoining Bledlow ridge, the Saxon princes planted their victorious standard to recall their troops from pursuit. Near Hampden house, a little to the south of the avenue, is the land for which Hampden was assessed twenty pounds ship-money, the payment of which being refused, caused the trial to take place so memorable in English history for the excitement it caused, and for its connexion with the great events then impending.

The walls of the mansion exhibit different styles of architecture, varying from the early Norman and the Tudor down to the "alterations" of a recent date, which Lord Nugent seems to think are anything but improvements. In the interior are some good paintings, principally family portraits. There is a whole-length of Hampden's cousin and great fellow-laborer in the early business of the revolution, Oliver Cromwell, standing with a truncheon in his right hand, and with his left resting on a helmet. His hair is gray. In the middle distance is seen a score of cavalry, and in the background a seaport with shipping.

The church of Great Hampden is situated immediately behind the mansion, and contains various memorials of the Hampden family. During the period that Hampden spent in the privacy of his residence here, when, disgusted with the aspect of affairs, he withdrew awhile from public life before the dissolution of parliament in 1628–'9, and while he was doubtless preparing himself for the more arduous contest that was yet to be fought, his first wife died. She lies in the chancel of the church; a beautiful epitaph on a plain black marble stone records her virtues and her husband's regret, in his own affectionate language. Here, too, his own ashes repose. By his will he directed a stone to be laid over his grave, with the figures of himself, his wife, and his children, engraved upon it. On the monument of the John Hampden we have before mentioned as the last male descendant of the family is a medallion, with a tree hung with shields, bearing the arms of the family and of its various alliances. At the foot of the tree is a representation, in basso-relievo, of the battle of Chalgrove field, fought June 18, 1643, in which Hampden was mortally wounded. There is a tradition preserved in the neighborhood, that when Hampden, for the first time in his life, left the field of battle before its termination, he was seen with his head bending down over the saddle, and his hands resting on his horse's back, moving in the direction of Pyrton house, the residence of his father-in-law, Edmund Symeon, Esq. There, says Lord Nugent, he in youth had married the first wife of his bosom, and thither now would have gone to die. But the situation of the enemy's cavalry prevented this, and he turned and rode across the grounds of Hazeley toward Thame. A brook crossed his way, which, summoning all his remaining strength, and setting spurs to his horse, he safely leaped. On reaching Thame he was conducted to the house of one Ezekiel Brown, where in a few days he died. Did we know nothing of the life of Hampden, we could not but revere and love the memory of the man whose dying words breathed forth so pure a spirit. We can not better conclude this description than with these simple but most touching and noble sentences. "O Lord God of hosts, great is thy mercy, just and holy are thy dealing unto we sinful men. Save me, O Lord, if it be thy good will, from the jaws of death. Pardon my manifold transgressions. O Lord, save my bleeding country: have these realms in thy especial keeping. Confound and level in the dust those who would rob the people of their liberty and lawful prerogative. Let the king see his error, and turn the hearts of his wicked counsellors from the malice and wickedness of their designs. Lord Jesu receive my soul!"



SUBJECT XIII.

(CONTINUED.)

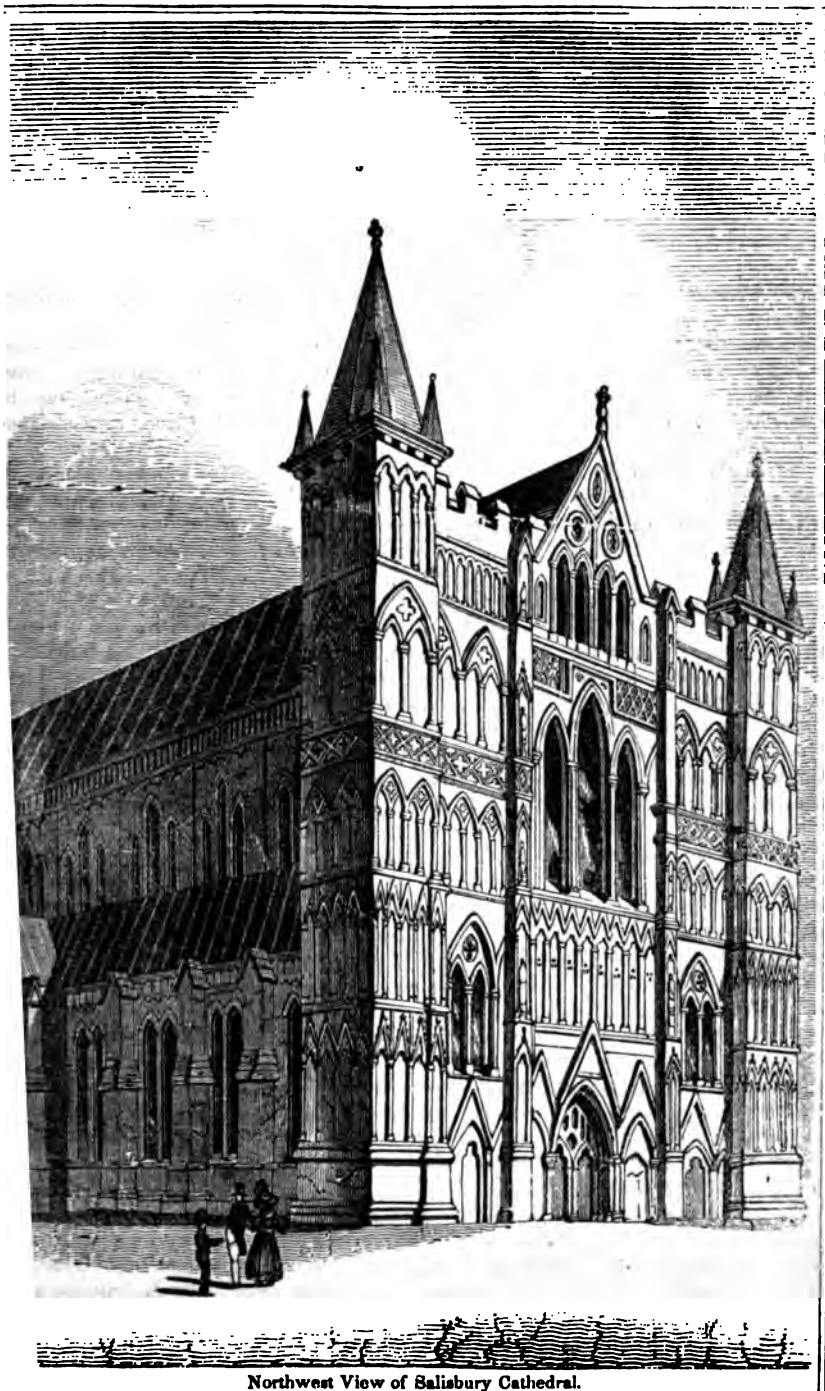
REMARKABLE EDIFICES.

E continue our sketches under the present head, and first of the—

Cathedral of Salisbury.—This is in some respects the most imposing structure among the English cathedrals. It is, in the first place, seen to great advantage, being, on three of its sides, unencumbered by the juxtaposition or close vicinity of any other buildings, and on the remaining or south side having only attached to it its own cloisters and chapter-house. Then the lofty spire which rises from its centre, but which is not seen in our engraving, is an erection unequalled by anything else of the same kind in England; and can not, on the first view at least, be viewed shooting upward and piercing the sky without the deepest emotions of wonder and admiration. The external aspect of the building generally, indeed, is noble and striking. Its interior, also, without possessing either the richness or grandeur of some of the other English cathedrals, is in a high degree beautiful and impressive.

The longer bar of the cross forming the structure, consists, as in other cathedrals, of a nave, with side aisles, a choir, and a lady chapel, taking its parts in order from west to east. At the end of the lady chapel is a large painted window. Besides the greater transept, the cathedral is crossed further to the east by another of smaller dimensions, and, on the opposite side, the north wall is also broken by a projection forming a porch, the architecture of which is of a very bold and majestic character. The façade of the west front forms nearly a square, and is, as usual, elaborately adorned by niches, statues, tracery, buttresses, and other varieties of decorations. Many of the statues have evidently been destroyed by violence; the drapery of some that partly remain possesses a high degree of excellence. Over the central door is a large window, divided into three compartments, the middle one rising considerably beyond the height of the other two. The length of this front is one hundred and twelve feet; but the line is extended for two hundred and seventeen feet further to the south by the west wall of the square forming the cloisters, which, as already mentioned, is attached to the south wall of the cathedral. East from this square, and communicating with it by a passage, is the chapter-house, an octagonal building of fifty-eight feet in diameter, by fifty-two in height, round the interior of which are the remains of a border of curious paintings representing scripture subjects. The extreme length of the church externally is four hundred and seventy-four feet, and that of the transept two hundred and thirty feet. The height from the floor of the nave to the roof is eighty-one feet.

But the glory of Salisbury cathedral is its great central tower, with the sharp-pointed spire by which it is crowned The entire height of this erec



Northwest View of Salisbury Cathedral.

tion is four hundred and four feet, being exactly twice that of the monument in London. It is the highest building of stone in England, although the old spire of St. Paul's, which was burnt down in 1561, is said to have risen to the altitude of five hundred and twenty feet. But that was of wood. The height of the present St. Paul's, reckoning from the floor of the church to the lantern, is only three hundred and thirty feet. The tower of Salisbury cathedral, up to the point at which the spire commences, is adorned with pilasters, columns, pinnacles, and other decorations. The spire has been a subsequent erection. It is stated by Mr. Francis Price, that, in order to enable the tower to sustain this additional weight, a hundred and twelve additional supports, besides bandages of iron, had been introduced into it, several windows by which it was formerly perforated having also been filled up, and the foundations considerably deepened and extended. The entire column in settling has swerved somewhat to the south and west, the summit of the spire being twenty-two inches out of the perpendicular, and the columns at the four angles of the tower in the cathedral are much warped; but it may be considered to be still, notwithstanding this, as secure and nearly in as perfect a condition as when it was first erected.

With the exception of the spire, this fine old cathedral is almost entirely the work of the thirteenth century. The episcopal see of Salisbury was originally fixed at Sherbourne in Dorsetshire, from which it was only removed in the year 1072. Herman de Lotharingia, the then bishop, began the building of a cathedral at Old Sarum, and dying in 1077, left the work to be carried on by his successor Osmund, by whom it was finished, and dedicated to the Virgin in 1092. This church stood upon a rising ground, within the bounds of the castle which then existed at Sarum; and in no long time disputes respecting jurisdiction appear to have arisen between the civil and ecclesiastical authorities. It would seem to have been principally on this account that the desire began to be entertained by the bishop and his clergy of transferring the cathedral to some other place. A bull, accordingly, having been obtained from the pope in 1219 to sanction the design, a wooden chapel was in the first instance erected on the ground occupied by the present cathedral, being a low field lying about a mile to the southeast of the ancient church, at the confluence of the Avon and the Nadder, and then known by the name of the Merryfield. The bishop at this time was Herbert, or, as he is called by other authorities, Robert Poore. The foundation of the present cathedral was laid on the 28th of April, in the following year. Poore died in 1229, but the building was carried on by his successors in the see, Robert Bingham, William de Yorke, and Giles de Bridport; by the last of whom it was brought to a close about the year 1260. The upper part of the tower and the spire, however, were added afterward, and probably, as Mr. Britton thinks, in the time of Bishop Robert de Wyvile, who occupied the see from 1329 to 1375. Soon after the cathedral had been begun, and when the bishop, the clergy, and their tenantry, had built houses, and established themselves around it, Henry III. granted them a charter, declaring New Salisbury (or Saresbury) a free city, and giving them leave to enclose it with competent walls and ditches, that it might be secure from the incursions of robbers, and all other hostile attacks. The power thus raised in opposition to that of the neighboring fortress, seems to have rapidly acquired the superiority over its rival; for in the time of Bishop Wyvile, the castle and cathedral of Old Sarum were ordered by Edward III. to be entirely destroyed, and the stones to be employed in the augmentation and improvement of the new one. It was probably with some of these stones that the new spire was built. Old Sarum, which was the capital of the west of England under the Saxons, a sta-

n of the Romans, and in all probability a British town before the arrival of ese invaders, was from this time nearly deserted; yet about a century ago is said to have still contained ten or twelve inhabited houses. It is now nolly uninhabited, and only a few bits of the wall remain. The trenches d earth-works around it, however, are of prodigious size, and unchanged: is a fine specimen of an old encamped station, the plan of which is as per-ct as if the works were standing.

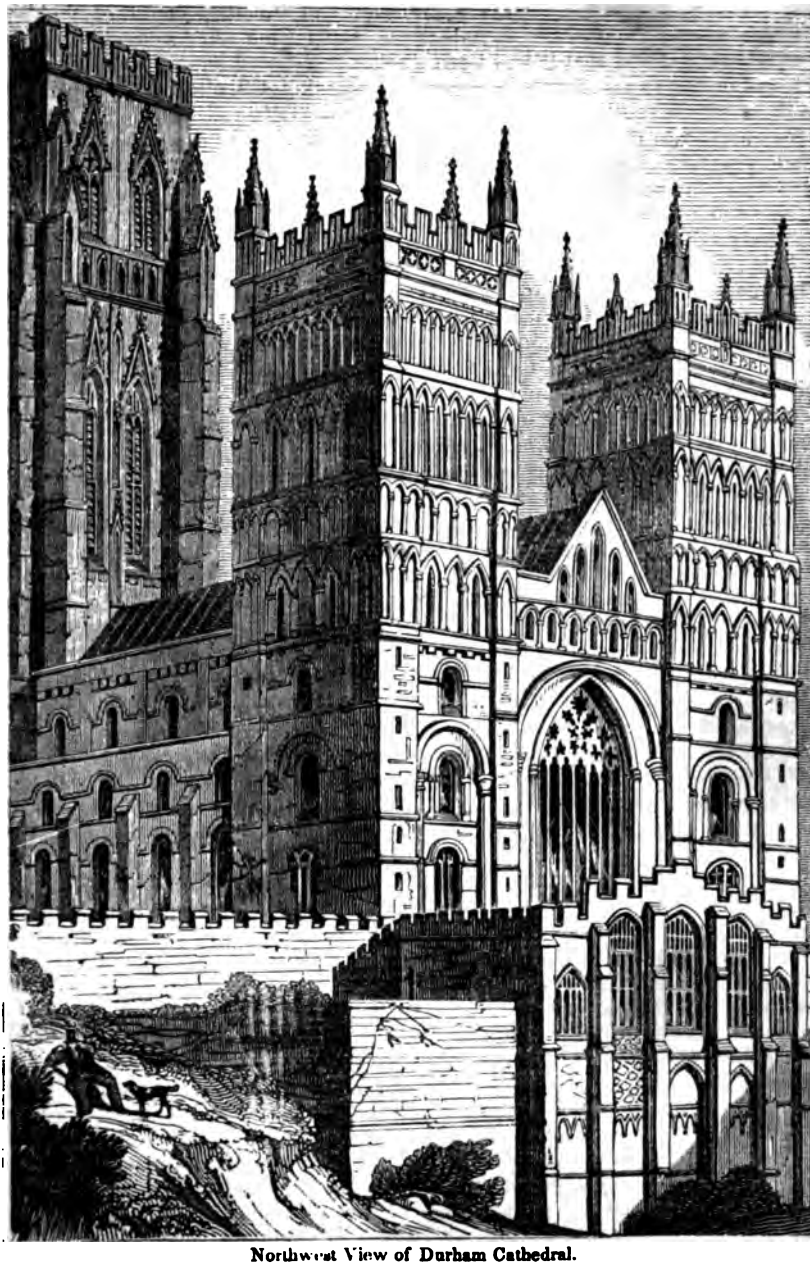
DURHAM CATHEDRAL.—The accompanying engraving represents a view of is massive and ancient pile. The earliest seat of the bishopric of Durham as the small isle of Lindisfarne, off the coast of Northumberland. Here, in e year 635, Aidan, a monk, brought from Iona by the Northumbrian king swald, who had received his education at the court of his relative, Donald V. of Scotland, fixed his residence, along with the other pious men who ere to be his assistants in the work of introducing and diffusing the light of hristianity among the pagan subjects of the Saxon sovereign. Another onk of Iona, named Corman, had preceded Aidan in the Northumbrian ission; but the severity of his temper, or his repulsive manner, is said to ive so greatly impeded his success in conversion, that after a short time he ive up the attempt, and returned to his monastery. The successor of Ai-an, who died in 651, and from whom Lindisfarne derived the name of Holy land, by which it is still known, was Finan, also from the same venerable orthern seat of sanctity. His incumbency lasted for ten years, during which e commenced the building of the first church on Lindisfarne, which was, owever, merely an edifice of wood, thatched with reeds. Other three Scotch shops followed, the last of whom, Eata, died in 685. The person next ap-ointed to the see was the renowned St. Cuthbert. This celebrated charac-r only held the office of bishop for two years; but his name has become ore intimately associated with the see in history and popular tradition than ny other with which it has ever been connected. He is said to have been riginally a shepherd, near Melrose; which condition he was induced to ex-hange, according to the legend, for that of a monk, by certain miraculous ntimations from heaven, which we shall not stop to recount. His devotion nd extreme asceticism soon procured him unrivalled celebrity. Not only as he believed to be endowed with supernatural powers while alive: for many ages after his death his mortal relics were regarded as having the prop-rty of working miracles. All who have read the early history of the Eng-sh church are familiar with the story of the manner in which the monks of indisfarne, driven from their original abode by the ravages of the Danish irates, were directed in their choice of a new residence by the dead body f St. Cuthbert. It is affirmed that the coffin in which it was deposited, after aving suffered itself to be carried about a long while by the wandering breth-en without resistance wherever they chose, suddenly halted when it was rought to the spot on which the city of Durham is now built, and could not y any force be removed from its station. This happened toward the close f the tenth century, in the time of Bishop Aldune, or Aldwine. The extra-rdinary event was, of course, assumed by him and his brethren to point out e place where it happened as the appointed site of their new monastery. 'reparations, accordingly, were immediately made for effecting the settle-ent thus distinctly commanded by Heaven. The miraculous tale was found, s might have been expected, to have a powerful effect in exciting the pious xertions of the neighboring inhabitants. The wood with which the place was overed was cleared by their fervent activity; and after the persevering labor f two or three years, the spire of a completed Christian temple was seen ising in the midst of the waste.

The present cathedral of Durham contains no portion of the church erected by Bishop Aldwine. It was begun in 1093, by one of his successors, William de Carilepho, who had been abbot of St. Vincent the Martyr, in Normandy, and presided over the see of Durham from 1080 till 1095. His immediate successor, Ralph Flambard, who held the office till 1128, continued the undertaking, and carried up the walls as far as the roof. The see was then five years vacant, during which the monks applied a great part of their revenues toward the completion of the work. It appears, however, not to have been finished till about the middle of the thirteenth century, when Nicholas Farnham was bishop, and Thomas Welscome, or Melsonby, or Malsamb, prior of the monastery. Indeed, some important additions seem to have been made to it within a few years of the close of the century.

The building therefore presents us with a complete exemplification or history of the progress of ecclesiastical architecture in England during the twelfth and thirteenth centuries. According to the account of it published at the expense of the Antiquarian Society, with the drawings of Mr. Carter, it illustrates the successive changes which took place during the reigns of the first three Henrys, till by degrees the pointed had completely superseded the circular roof, and the heavy Norman pillars had become polished into the light shafts of the early English. The general character of the edifice, however, is massy and ponderous, only a few of the last finished parts exhibiting the commencement of a lighter style. Some of the more ancient pillars are twenty-three feet in circumference. Within the last half century it has undergone extensive repairs in almost every part; but these unfortunately have not been generally executed in the best taste, nor with sufficient attention to the character of the original building. The south front is the one that preserves its ancient appearance most entire; but it is in great part encumbered and concealed from view by the cloisters, and other extraneous erections. The west front is the richest and most imposing. Besides the square towers surmounted by pinnacles, which, as usual, crown its extremities, it is adorned by a projecting chapel in the centre, called the Galilee, flanked by buttresses and arches. The Galilee appears to have been repaired and renovated by Cardinal Langley, who was bishop of Durham at the commencement of the fifteenth century, and it is finished accordingly in a much more florid style than the greater part of the cathedral. It is eighty feet in length by fifty in breadth. Over it is a window of large dimensions, but of no remarkable beauty.

The cathedral of Durham stands on the summit of the mount around which the town is built, and occupies, therefore, a singularly conspicuous and commanding position. Both from its site and its size it far overtops all the other buildings in the midst of which it is placed, and is seen from a great distance rising high above the horizon. It is built in the customary form of a cross; but in addition to the great central transept, which is one hundred and seventy feet in length, it has smaller cross aisles at both its eastern and western extremities. A richly-ornamented tower ascends from the centre of the building to the height of two hundred and twelve feet; and two others, as already mentioned, of less height and plainer architecture, rise over the western front. The entire cathedral is about four hundred and eleven feet in length and about eighty feet in breadth.

Winchester Cathedral.—The foundation of the cathedral of Winchester, has been carried back so far as the middle of the second century after the birth of Christ, when, it is affirmed, the British king Lucius, having become a convert to the true religion, erected here the first Christian church, on the site of the chief pagan temple. This legend, how ver, rests on too



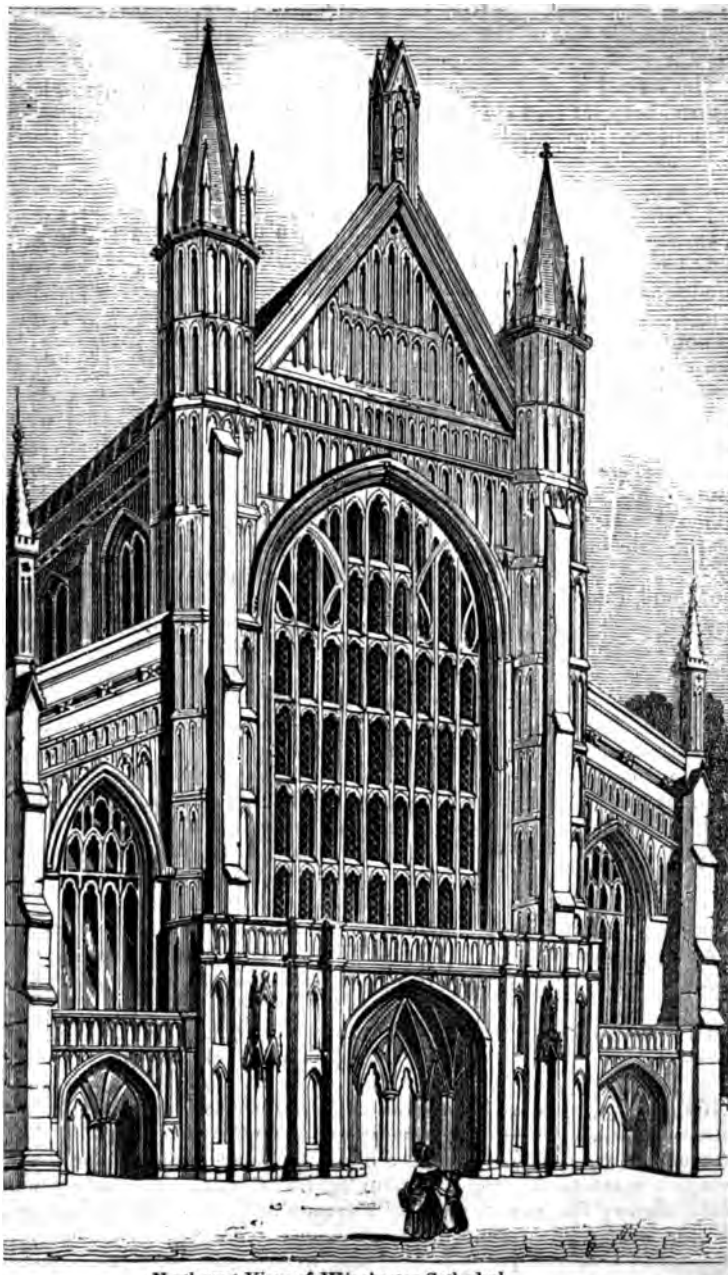
Northwest View of Durham Cathedral.

uncertain authority to be entitled to much regard. All that we really know of the ecclesiastical history of those times is, that Christianity was undoubtedly introduced into the island in the course of the first century; that the converts among the Roman settlers were some time after considerable for their numbers; and that it had been generally diffused among the British inhabitants prior to the Saxon invasion. It was not till after the commencement of the seventh century, that the Saxon kings and people of Wessex were induced to relinquish paganism. The first of the former who was baptized was Kinegils, the great-great-grandson of Cerdic, the founder of the dynasty. His conversion, which took place about the year 635, and which was speedily followed by that of the greater number of his subjects, is attributed to St. Birinus, who had been sent over to preach the gospel from Italy by Pope Honorius, and is accounted the first bishop of Winchester. Kinegils began the building of a cathedral, but his death, which took place soon after, prevented him from carrying it much beyond the foundation. The work, however, was continued by his son and successor Kenewalch, and brought to a conclusion in 648, when it was dedicated to the Holy Trinity, and to the apostles Peter and Paul.

This edifice is described as having been of great extent and magnificence; but any considerable building of stone, which is said to have been the material employed in the present instance, was calculated to excite admiration in that age. It stood, there can be no doubt, on the same spot which is occupied by the existing cathedral. In 871, however, in an attack made upon the city by the Danes, the sacred structure appears to have been, if not entirely demolished, so terribly injured as to have been reduced to little better than a ruin. It is probable that it was repaired by the great Alfred, when, some years after, he regained the throne of his ancestors; but in the middle of the next century we find the fabric to have fallen again into such complete decay, that the then bishop, St. Ethelwold, determined to pull it down, and rebuild it from the foundation. St. Ethelwold's cathedral was finished in the year 980.

Much controversy has taken place as to whether any, or how much of the building erected by St. Ethelwold, remains in the present cathedral. Some have contended that the entire church was rebuilt about a century after by Bishop Walkelyn, the prelate who was first appointed to the see after the conquest; and certain of the statements of the old ecclesiastical historians would seem to imply that this was the fact. It seems to be generally acknowledged, however, that the character of the architecture of part of the east end is nearly decisive in favor of its superior antiquity to that of the rest of the church, and especially of the tower and those portions of the transepts and nave which are known to be the work of Walkelyn. Some have even contended, on evidence of a similar description, that parts of both the transepts and the nave must be considered to be of the age of Ethelwold

The central tower, however, was undoubtedly built by Bishop Walkelyn, whose repairs and additions, whatever was their extent, were regarded as so important, that, upon their completion in 1093, the church underwent a new dedication, to St. Peter, St. Paul, and St. Swithin. After this, a portion of the east end was rebuilt toward the close of the eleventh century, by Bishop Godfrey de Lucy. But the most important improvements which were made on the original structure, were those which were commenced soon after the middle of the fourteenth century, by Bishop William de Edyndon, and continued and completed by his illustrious successor, William de Wykeham, who held this see from 1366 to 1404. The latter prelate may be said to have rebuilt nearly the whole of the cathedral to the westward of the central tower;

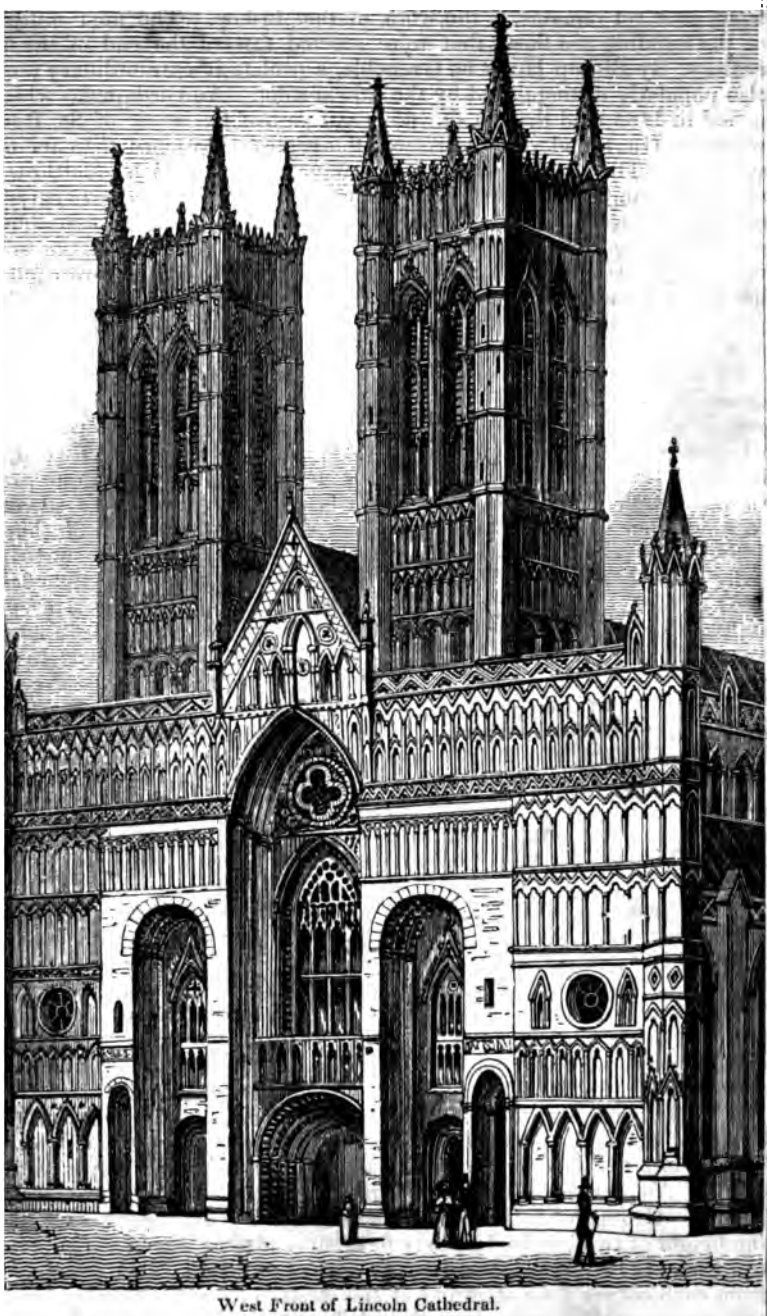


Northwest View of Winchester Cathedral.

and to him in particular is to be attributed the construction of the great west front, which is by far the most magnificent part of the edifice as it now exists. Finally, in the early part of the sixteenth century, a considerable part of the church to the east of the central tower was restored by Bishop Richard Fox, another of the most distinguished prelates by whom this see was governed.

The cathedral of Winchester, it will be perceived from this sketch of its history, may be regarded as a nearly complete record and exemplification of all the successive changes in the Norman style of architecture, from its rise, or at least its introduction into this country, in the eleventh, till its disappearance in the sixteenth century. The building is in the usual form of a cross; and is one of the largest English cathedrals, its length from east to west being five hundred and forty-five feet, and the breadth of the nave and aisles eighty-seven feet. The length of the transepts, from north to south, is one hundred and eighty-six feet; and the roof of the nave is seventy-six feet in height. With the exception of the west front—which, with its noble window, its buttresses and pinnacled turrets, and the canopied statue of Wykeham that crowns its pointed termination, has a grand and imposing effect—the exterior of the church has but little to recommend it. The extreme plainness of its architecture, its long, unbroken continuity of roof, and its short and squat tower, give it altogether rather a homely and almost heavy air. Placed as it is, besides, in a low situation, were it not for its immense mass, would scarcely have anything to distinguish it from the undecorated buildings by which it is surrounded. The interior, however, is such as amply to make up for this deficiency of outward display. The vast length of the vista formed by the nave and choir, with the splendid ceiling overhead—the lines of columns and arches on each hand—and the large and beautiful window that casts its light down from behind the choir, at the termination of the view—all contribute to produce upon the spectator as he enters from the great western door, an overpowering impression of solemnity and magnificence. And when he proceeds to examine the objects by which he is surrounded more in detail, he discovers everywhere a richness of ornament which it is impossible to look upon without admiration. Not to speak of a profusion of modern monuments, there are placed in different parts of the church various ancient chantries and tombs, exhibiting some of the finest efforts of Gothic sculpture in the world. The chantries, in particular, of William of Wykeham, of Bishop Fox, of Cardinal Beaufort, and of Bishop Waynflete, are structures of the most superb description. Behind the altar, also, is a stone screen erected by Bishop Fox, a work of wonderful elaboration and beauty. The altar is ornamented by West's picture of the raising of Lazarus from the dead, one of the most successful works of that master. Many venerable relics of antiquity are likewise here preserved, of which we can not attempt a detailed notice.

Lincoln Cathedral.—This cathedral is venerable for its antiquity, and on account of the pious munificence of which it is a monument. The original seat of the bishopric of Lichfield was at the village of Dorchester in Oxfordshire. A church was built here so early as 635. Soon after this, namely, about 678, another see was established at Sydnacester, on the Trent, which was united with that of Dorchester in the ninth century, on the district in which it was situated being overrun by the Danes. The last bishop who resided during the whole time of his incumbency at Dorchester, was Ulf, or Wulfin, who died in 1067. His successor, Remigius de Fescamp, called St. Remigius, removed the episcopal seat to Lincoln some time between 1072 and 1092. He also built the first cathedral there, which he just lived to finish, dying on the 9th of May, 1092, only a few days before its consecration;



West Front of Lincoln Cathedral.

and the present structure is still the original cathedral of St. Remigius, although in part rebuilt and greatly enlarged. The lower portion of the west front, as it yet remains, is the work of that bishop. The next oldest parts of the building are those that were erected toward the end of the twelfth century, By Bishop Hugh be Grenoble, a prelate of extraordinary piety, and also popularly distinguished by the title of saint. An earthquake which happened in 1185, had thrown down a great part of the work of St. Remigius, when St. Hugh undertook to restore the cathedral to more than its original splendor. The good bishop was so intent, we are told by Matthew Paris, upon the completion of his pious enterprise, that he was wont to carry stones and mortar on his shoulders for the use of the masons. The east side of the central transept is considered to be a still remaining portion of the additions made by St. Hugh. In 1239 the greater part of the central tower fell down; but it was rebuilt by Robert Grostête, or Greathead, one of the most learned personages of that era, who was then bishop of the diocese. Bishop Grostête was one of those cultivators of physical science in the dark ages, to whom is ascribed the fabrication of a brazen head, which is said to have been able to speak as if it had life. A similar fable is related of Albertus Magnus and Roger Bacon. To the tower rebuilt by Grostête, Bishop de Alderly, who governed the see from 1300 to 1319, added a lofty spire of wood, which remained till it was blown down by a tempest in 1547. The same prelate is supposed to have built the two western towers, which were also surmounted with wooden spires. They were taken down by the dean and chapter in 1808. The person by whom the remaining parts of the fabric were principally erected, was John Welbourne, who was treasurer of the cathedral from 1351 to 1381. The upper part of the south end of the great transept, the stalls of the choir, and the statues and windows above the western entrances, are ascribed to him. Since his time no considerable additions have been made to the building; but it has frequently undergone extensive repairs. The cathedral of Lincoln stands upon ground of considerable elevation, and overlooking a flat country may be seen from the distance of twenty miles. Fuller remarks that its floor is higher than the roofs of most other churches. It is built in the usual form of a cross, with this peculiarity, however, that besides the great transept in the centre, it has also shorter transepts both at the east and the west end. A building, called the cloisters, issues from the north wall, and to the extremity of this is attached the chapter-house, a circular structure, surrounded by deep buttresses, and surmounted by a pyramidal roof. The dimensions of the cathedral are very great, the whole length of the interior being four hundred and seventy feet. The western front is one hundred and seventy-four feet wide, and the length of the great transept is two hundred and twenty feet in the interior. Its width is sixty-three feet, and its height seventy-four. The chapter-house is above sixty feet in diameter, the roof being supported by a single cluster of columns in the centre. The circumference of this room is divided into ten compartments, or sides, one of which is occupied by the door, and the other nine by windows.

The most imposing exterior part of the cathedral is the west front. The centre of the under portion of it is occupied by a large and deep doorway, leading into the nave, on both sides of which are humbler entrances into the aisles. Above these is a façade richly ornamented with windows, niches, and statues. Groups of turrets crown the extremities, and two towers, rising to the height of two hundred and six feet, surmount the whole. The great central tower is two hundred and sixty-two feet in height; and pinnacles shoot from each corner both of it and of the western towers. Similar ornaments rise above each buttress, along the whole extent of the nave and choir.

The cathedral of Lincoln was in old times celebrated for the extraordinary endor of its shrines, and other decorations; but the reformation stripped of all this wealth. Down to a much later period, however, it was crowded h ancient tombs, many of them curious for their rich sculpture, others hly interesting on account of those whose remains they contained, and of om they were memorials. They were, however, nearly all destroyed in time of the commonwealth. When the storm of the civil wars was felt be approaching, Sir William Dugdale, in 1641, proceeded to copy all the taphs he could find in Lincoln and other cathedrals, "to the end," as he s in his life, "that the memory of them, in case of that destruction then minent, might be preserved for future and better times;" and in the sec- l volume of Peck's Desiderata Curiosa, is given an account of one hun- d and sixty-three monumental inscriptions, as they stood in this cathedral the year mentioned.

The Cathedral of Wells.—This is, in many respects, one of the most gnificent of English cathedrals. Its form is the usual one of a cross, the ncipal limb or bar, which extends from east to west, being 371 feet in gth, and the other, or the transept, measuring 135 feet from north to th. Over the junction of the nave and transept is a tower rising to the ght of 160 feet; and two other massive towers, each 126 feet in height, wn the extremities of the west front. This façade, as may be seen from engraving, presents a remarkably splendid display of tracery and sculp- d figures. Altogether there are introduced into the composition no fewer n one hundred and fifty statues of the size of life, and above three hun- d others of smaller size. Notwithstanding the mutilation which nearly of these sculptures have undergone, the effect of so vast a throng of fig- s, and of the elaborate decoration of every niche and buttress, is rich in extreme. The towers, by which the whole is surmounted, add greatly the grandeur of the display, and make this erection altogether one of the st noble and imposing of which the architecture of the middle ages can ast.

The first church at Wells is said to have been founded by the great Ina, g of Wessex, in 704. The town, however, does not appear to have be- me the seat of a bishopric till the reign of Edward the Elder, in the begin- g of the tenth century. But the early history of the see is extremely scure. The first bishop of whom there is any certain account is John de llula, who, before his elevation to the mitre, is said to have practised ysic at Bath, and by that means to have earned the means of purchasing see from the rapacious Rufus. This was about the year 1091. As soon he obtained his ecclesiastical dignity, De Villula removed the episcopal t from Wells to Bath, whether with the object of still continuing to pursue original profession we do not know, but, at any rate, not without all the position in their power from the subordinate functionaries of the former rch. The act, indeed, was the occasion of bitter and long-protracted ani- sity between the Wells and Bath establishments, whose disputes were her appeased for the moment than finally settled, by the decision of De llula's successor, Bishop Robert, about the year 1139, that the diocesan ould be styled bishop of Bath and Wells, and be enthroned, on his admis- n, in both churches. De Villula had thrown aside the old title altogether, d called himself bishop of Bath only. But although this prelate is not oken of in very laudatory terms in the chronicles of his church, and his ght regard for the more ancient seat of his bishopric, in comparison with city in which he had been accustomed to exercise his lay functions, seems have been strongly enough manifested, he was probably a person of much

greater merit than his detractors would lead us to conclude. From his successful practice as a physician, we may suppose that in learning and scientific knowledge he was considerably beyond his age. Notwithstanding, too, what is reported of the way in which he obtained his bishopric, he does not appear to have been deficient in the munificence becoming his place. He built, out of his revenues, a new church at Bath, being the structure which preceded the present abbey church. At Wells, however, he allowed the cathedral to fall to ruin; and he also gave great offence, not unnaturally, to the canons, by pulling down a cloister, hall, and dorter, or lodging-place, which one of his predecessors, Bishop Giso, had built for them, and erecting a residence for himself on their site. It must be confessed that he would seem to have carried matters with rather a high hand.

De Villula died in 1123, and was succeeded by Bishop Robert, already mentioned, who repaired or rebuilt the cathedral, which his predecessor had allowed to go to decay. After him Reginald Fitz-Joceline, archdeacon of Salisbury, was appointed to the see. This prelate, who was afterward elected archbishop of Canterbury, though he died before his actual removal to that see, obtained from King Richard I. a strange grant, the original of which is still preserved, giving him and his successors the right of keeping dogs for hunting over all the county of Somerset, as fully, so it runs, as any of his predecessors had ever enjoyed the same.

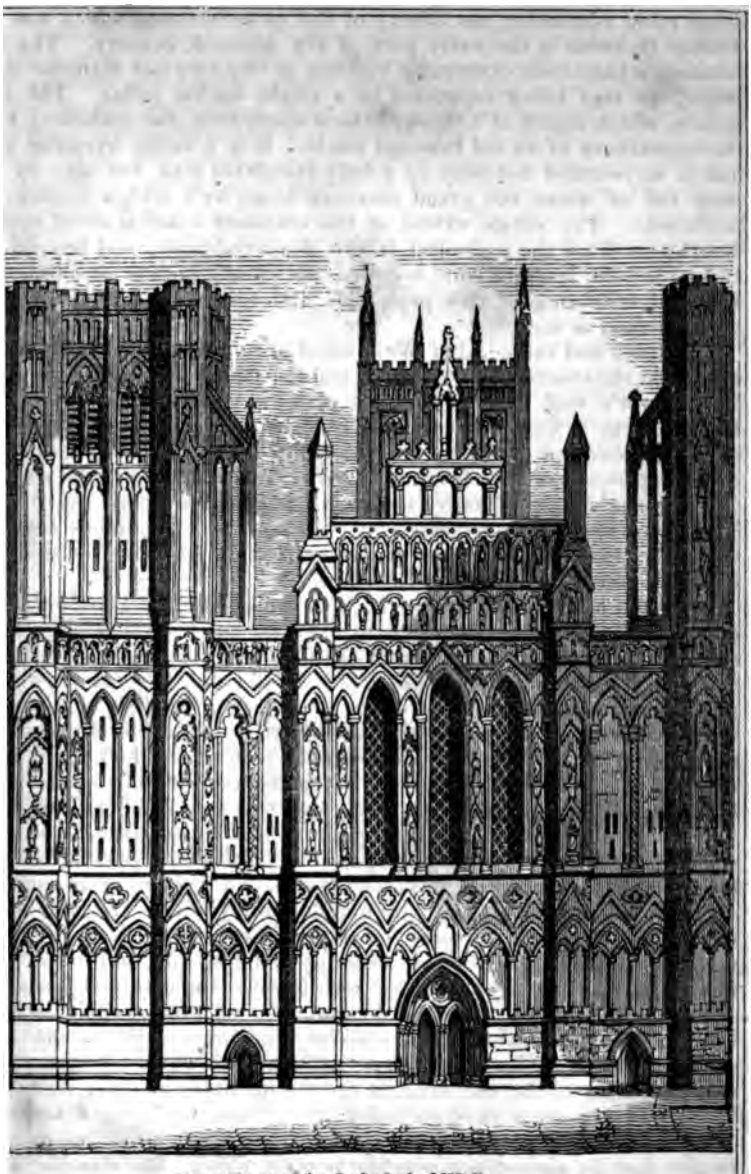
The present cathedral was begun in the early part of the reign of Henry III., or before the middle of the thirteenth century, by Bishop Joceline de Welles, or Troteman, as he is otherwise called, who also made Wells his place of residence, and in other respects restored it to the precedence which, in everything except the title of the see, it has since retained.

The entire body of the church, from the west end to the middle of the present choir, is supposed to be the work of Bishop Joceline de Welles. The two western towers, however, were only added, that on the south about the end of the fourteenth century, by Bishop John de Harewell, and that on the north about twenty years after, by Bishop Budwith. Before this the body of the church had been completed to its eastern extremity; and the great central tower had also been erected by Bishop Drokensford, soon after the commencement of the fourteenth century, in the reign of Edward III. This at least is Mr. Britton's conjecture, from the style of the architecture.

The interior of the greater part of this cathedral partakes of the massive character which belonged to the earliest age of what is called the Gothic style. The eastern portion, however, which is of later date, is distinguished by much greater lightness. But the glory of the cathedral is the Lady chapel, placed, as usual, beyond the choir. Here the columns are formed of clusters of the most slender and elegant shafts, crowned with capitals of exquisite richness and beauty, while all around is a profusion of the most elaborate ornament. As a whole, this chapel has been sometimes esteemed the most beautiful and perfect gem of ecclesiastical architecture in England.

Many ancient and some sumptuous monuments are dispersed over the different parts of the cathedral. Of these one of the most remarkable is that of Bishop Thomas, of Beckington, who died in 1465, after having, during the twenty-two years that he held the see, expended large sums on the repair and extension of the cathedral. It is in the choir, and presents a very rich and elaborate display of carving and sculpture.

The cloisters, the chapter-house, and the bishop's palace, which are in the vicinity of the cathedral, are all highly deserving of inspection. The cloisters form a large quadrangle attached to the south side of the church, the sides measuring severally from 150 to 160 feet in length. Over the east side is a



West Front of the Cathedral of Wells.

large room containing the library of the establishment, which was built by Bishop Bubwith in the early part of the fifteenth century. The chapter-house is a handsome octangular building of fifty-two feet diameter in the interior, the roof being supported by a single central pillar. The episcopal palace, which stands at a short distance south from the cathedral, has quite the appearance of an old baronial castle. It is a large, irregular structure, and is surrounded not only by a lofty embattled wall, but also by a broad moat full of water, the grand entrance being by a bridge thrown over the north side. The entire extent of the enclosed space is about seven acres. Northwest from the cathedral is the deanery-house; and beyond that are twenty houses, forming what is called the Vicar's college or close, an establishment consisting of two principals and twelve vicars, five of whom are distinguished as seniors.

The town and cathedral of Wells stand in a valley at the foot of the Mendip hills, near the source of the river Ax, and also near that of another spring called St. Andrew's well, from which the place is supposed to derive its name. Hills rise at a little distance nearly all around, some being wooded, while others are covered only with their native green sward. The cathedral forms a striking object as seen from all the great roads leading to the city.

The term MAGNA CHARTA is a sound familiar to almost every American. There are many persons, however, who are probably more familiar with the sound than with the sense of the expression, and may be glad to have a short account of what Magna Charta is.

John (the sixth son of Henry II., and the great-great-grandson of the conqueror), who obtained the throne in 1199, on the death of his brother Richard I. (Cœur de Lion), was one of the most unprincipled and profligate characters in the line of English kings. If he did not owe his crown to an act of usurpation (for it would be unfair, considering the then unsettled state of the law of succession, to say that the claim of Arthur of Brittany, the son of his elder brother Geoffrey, was clearly better than his), there is at least every reason to believe that he did not scruple to secure it by the murder of his young nephew. The rest of his reign was worthy of its bad beginning. During the short intervals of prosperity which he enjoyed, he showed himself a licentious and heartless despot; but for the most part he only escaped from one disaster to be overtaken by another, till poison, or as some accounts say, a broken heart, brought him to an untimely grave. He was stripped of the possessions of his ancestors on the continent, by the king of France; he was afterward obliged to resign even his realm of England to the pope, and, finally, he was beaten in a contest with his own subjects, and forced to accept of such terms as they chose to dictate. On all these occasions of adverse fortune, he demeaned himself with an abjectness equal to the arrogance which he displayed at other times; and no shift was ever either too mean and perfidious on the one hand, or too impudent on the other, for him to avail himself of, as soon as an opportunity offered, to escape from his engagements. With all this want of principle, however, John was not without qualities fitted to give him an ascendency over the popular mind. He was far from being deficient in the martial spirit and personal courage of his race; ill-directed as they were, his intellectual powers seem to have been acute and vigorous, and he could put on, when he chose, an affability of manner which took the multitude. Probably the truest picture we have of him, is that which has been drawn by Shakspere. The great dramatist, who knew so well how to put life into the dead forms of history, has represented him as selfish, unscrupulous, and cruel, but at the same time as displaying eminent ability, and bravery worthy of a better cause.

was in the year 1214, soon after John had become reconciled to the pope, ıad delivered himself from excommunication, by consenting to hold his lom as a vassal to the see of St. Peter, that his renewed excesses of tyr- and oppression at length aroused against him the general indignation s subjects, and determined them to take measures for the recovery of liberties. There never was a more complete subjugation of any peo- ıan that of the Saxons of England, by the Norman invaders. Not only he vanquished nation deprived of its political independence, the inhab- individually were stripped of their property, and reduced almost to r of slavery. In twenty years after William's accession, probably nine ı of the land in England had been transferred to the possession of Nor- . It was a hundred years after that event, before any person of that ı was preferred to any public office or employment. During the whole ıt period, the native English were treated by their foreign masters al as an inferior race.

e Saxons, however, still formed the great body of the population. The ıeror's military followers, although numerous enough to secure him the ı, and also in a short time to appropriate all the landed estates in Eng- were quite insufficient to supply the country with a new population. consequence was that England remained England notwithstanding this gation. The Saxon blood, and the Saxon tongue, although all was done long series of years, that a tyrannical policy could do to tread both in- ı earth, were too strongly rooted to be thus destroyed, and both eventu- ose and reclaimed their old inheritance.

e intermixture of the two races, or rather the absorption of the foreign- ıto the mass of the native population, must have commenced in the e of the first half century after the conquest; and, by the time of John, rocess must have been carried to a considerable length. This was the n which the English re-conquered their conquerors. It is indeed sur- ıg to find how early the national sentiment, which was thus generated, ned entirely an English tone. It was for the rights and privileges of ishmen that every struggle was waged which the subject carried on with overeign. The Normans themselves never demanded the restitution of ıing Norman. The universal cry already was for the old laws and in- ions of Saxon England—for the liberties which the country had enjoyed ı time of Edward the Confessor. And to the perseverance with which ry was urged, and the success with which it was at length crowned, it ing that at this day, the English laws, as well their blood and language, ıainly Saxon.

ıe heart of the nation, then, being thus set upon the recovery of its an- freedom, a large body of the nobility, having made various previous ar- ıments, assembled toward the close of the year 1214, and probably, as e Blackstone thinks, on the twentieth of November, being St. Edmund's in the abbey-church of Bury St. Edmunds, in Suffolk, on pretence of ion, but in reality to enter into a solemn league against the throne. swore on the high altar to wage war against the king, until he should ı to their demands. On epiphany day (the 6th of January), 1215, they ı in a body to London, and immediately sent a deputation to his majesty, was then lodged in the Temple. Although alarmed at what he perceived ı the strength of the confederacy, John did not at once yield, but re- ed time to consider their proposals. A respite was granted him till the of Easter. Meanwhile both parties prepared themselves for the coming ıt. But although the king obtained a prohibition against the proceed- of the barons from the pope, he soon found that this spiritual aid was

nearly all upon which he could count. The thunders of the Vatican were never much regarded, either in England or any other country, when directed against a really popular cause; and, in this instance, the admonition and menaces of his holiness were entirely unheeded. Immediately after Easter, which fell that year on the 19th of April, the barons had assembled at Stamford in Lincolnshire with a numerous army; the pope's letters arrived the following week; but on Monday, the 27th, the insurgents marched to Brackley in Northamptonshire, and there encamped, about fifteen miles from Oxford, where the king was.

A deputation soon arrived from John desiring to know the reason of their assembling; to which they made answer by a written exposition of their demands, accompanied with an intimation that they would immediately proceed to seize the royal castles, in the event of their suit not being complied with. Nothing definitive, however, resulted from these negotiations.

The barons, then looking to the speedy commencement of warlike operations, chose one of their number, Robert Fitzwalter, the general of their army, under the title of marshal of the army of God, and of holy church. On the 5th of May, at Wallingford (some authorities say at Reading), they solemnly threw off their allegiance to the king. They then attacked the castle of Northampton, from which they were repulsed; but they took that of Bedford; and, marching thence to London, were admitted by the citizens, on Sunday, the 24th (or as others say the 17th) of May.

By this time the king seems to have become convinced that further resistance would be vain. All had deserted him except seven lords, accompanied by whom he had retired to Odiham in Hampshire. In these circumstances he sent a message to the confederated barons, promising compliance with their wishes, and soliciting a conference.

Tuesday, in Whitsuntide, being the 9th of June, was accordingly appointed as the day on which the two parties should meet to settle their differences, in the plain of Runnemede, which happened to lie about half way between Odiham and London. On the 8th the king came to Merton in Surrey, and there granted letters of safe-conduct to the barons. But it was afterward agreed to defer the meeting till the Monday following, and in the meantime the king went to Windsor. On that day, being Trinity Monday, the 15th of June, the king and his revolted subjects took their places opposite to, and at some distance from each other on the appointed ground. The barons came in great numbers; but John was accompanied by only a few followers.

Runnemede, or Runneymead, which these proceedings have made for ever famous, is a large plain on the southern bank of the Thames, in the parish of Egham, in Surrey. It lies between the river and the town of Egham. During the last week of August it is used as a race-ground; and the races seem to be of considerable antiquity. Hence the name has been supposed by some to mean running mead; but it is much more probable that it means the mead of council, from the Saxon rune, it having, as old historians state, been frequently before this, the scene of conferences and debates on public affairs.

The proceedings on the present occasion appear to have been commenced by the barons submitting their demands to the king, drawn up in the form of preliminary articles of agreements, to which he affixed his seal. This interesting document is now in the British museum. The seal attached to it is in a much more perfect state of preservation than those belonging to any of the still existing copies of the charter itself; and from it, accordingly, the representations on the opposite page have been taken.

These articles seem to have been then embodied in the form of a charter,

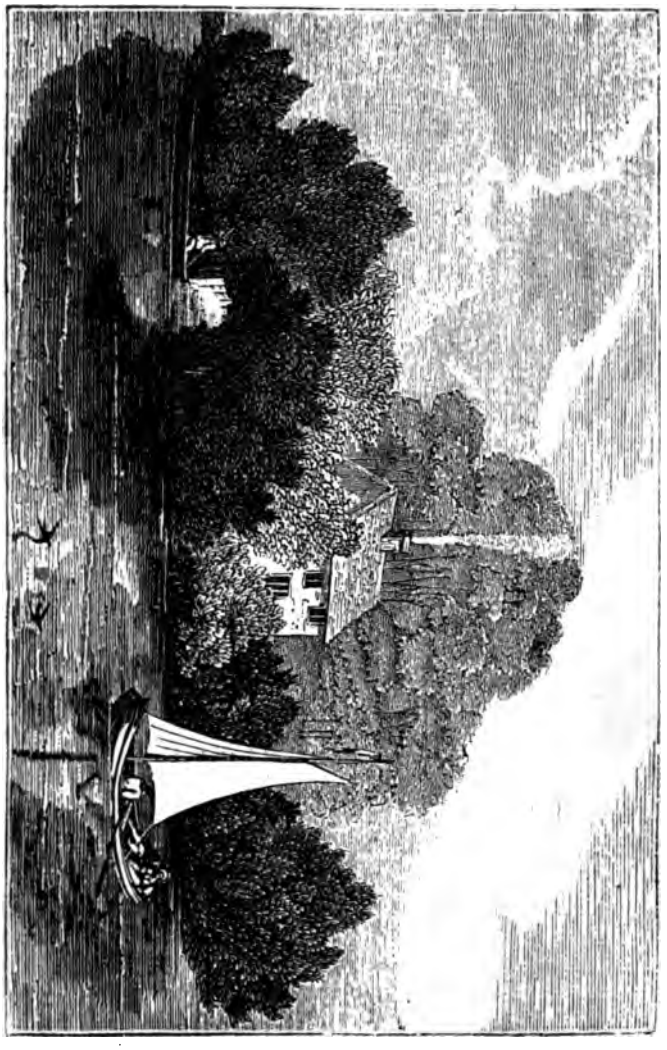
[Copy of the Seal of King John to the agreement with the Barons.]

Facsimile of the Writing of Magna Charta.

being that which is commonly entitled the *Magna Charta communium libertatum*, or great charter of the common liberties. Both documents are date the 15th of June, but it is stated by various authorities, that the charter wa not actually signed till the 19th. There is also a tradition that the ceremon did not take place on the plain of Runnemede, but on a neighboring isle i the Thames, still known from the circumstance by the name of Magna Char ta, or Charter island. A view of this island, with the building in which th charter was said to be signed, is seen on the opposite page.

Copies of the charter were sent after its signature to each county, or a least to each diocese, in England; but of these, we believe, only three ar now known to exist. Two are in the museum, having formed part of the collection of Sir Robert Cotton, by whom one of them is said to have been recovered from the hands of a tailor, when he was in the act of proceeding to cut down the parchment for measures. They are slightly injured by a fire which consumed a part of the Cottonian library, before it was removed to its present depository; the waxen seal which is attached to one of them, having been partly melted by that accident. The other has only the slits by which the seal had been formerly fastened to it. There is a third copy in the library of the cathedral of Salisbury.

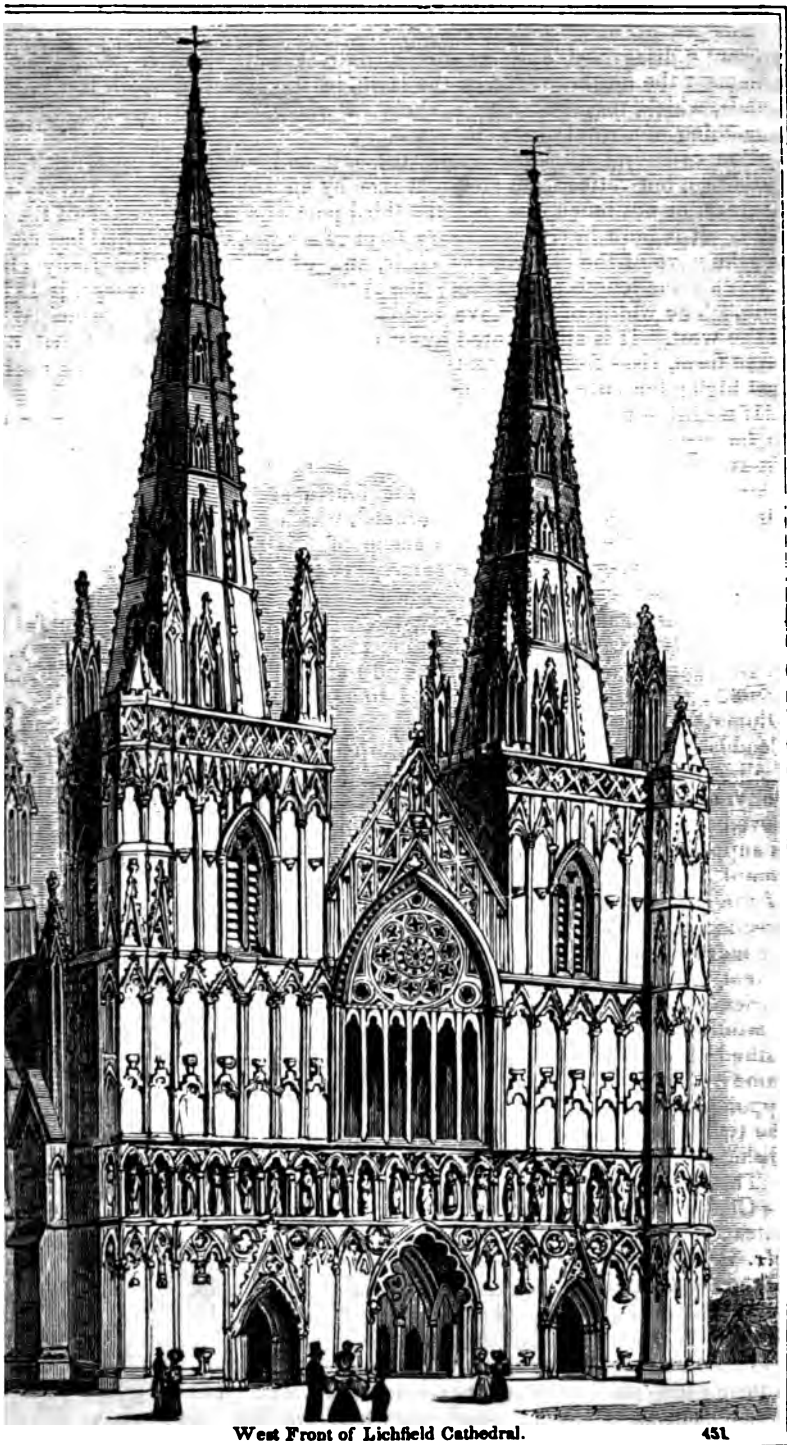
The great charter, having been extorted chiefly by the power of the clergy and the nobility, contained, as was to be expected, various provisions highly favorable to the interests of both these classes. But these we shall not at present stop to consider. The more important and more interesting parts are those that refer to the body of the people. It is, however, to be recollected, that at this time probably the great majority of the inhabitants of England were still in what was called a state of villanage, that is to say, were the bondsmen and property of the landed proprietors upon whose estates they lived. The first great cause which operated in bringing about the extinction of villanage was the rise of towns. It was a privilege early granted to burghs in England, that any slave taking refuge in one of them, and residing there a year and a day, became thereupon free. These free towns or burghs, accordingly were, at the time when Magna Charta was granted, the only places in the kingdom where any considerable number of the commonalty was to be found not in a state of bondage. To the clauses of the charter, therefore, which refer to the towns, we are principally to look for the degree in which it established or extended popular freedom. None of the parties concerned in the transaction, certainly, entertained any idea of a general emancipation of the villains. Those composing this part of the population, were universally considered as mere goods or chattels, and as such not comprehended in the community at all. By one of the articles indeed of this very charter of the common liberties, the laborers by whom the land was cultivated are classed along with the cattle and instruments of husbandry; the guardian of an heir who is a minor, it is declared, shall manage his estate without destruction and waste either of the men or goods. It is undeniable, therefore, that Magna Charta neither abolished slavery in England, nor contained any provision tending in that direction; and it may therefore in one sense be asserted to have left the great body of the people as it found them. But in regard to the free population this is not a correct statement. One of the clauses assures to all cities, burghs, towns, and ports, the enjoyment of their liberties and free customs both by land and water, for which till now they had been all regularly in the practice of paying a yearly tax or bribe to the crown. A considerable part of the royal revenue was derived from this source. Other articles promulgated various enactments decidedly favorable to the interests of commerce.



Magna Charta Island.

But the article of Magna Charta which is to be considered as most valuable in reference to the general liberties, for the sake both of the actual securities which it established, and the principles of which it involved the acknowledgment and proclamation, is that of the original of which we have given a fac-simile on page 447: "Nullus liber homo capiatur, vel imprisonetur, aut dissaisietur, aut utlugetur, aut exuletur, aut aliquo modo destruatur; nec super eum ibimus, nec super eum mittemus, nisi per legale judicium parium suorum vel per legem terre. Nulli vendemus, nulli negabimus, aut differemus rectum aut judicium;" that is to say, in English: "No freeman shall be apprehended, or imprisoned, or disseized (deprived of anything he possesses), or outlawed, or banished, or any way destroyed, nor will we go upon him, nor will we send upon him (pronounce sentence against him, or allow any of the judges to do so), except by the legal judgment of his peers, or by the law of the land. To none will we sell, to none will we deny, to none will we delay, right or justice." This solemn recognition of the liberty of the subject at once laid, broad and deep, the foundations of a free constitution. Sir Edward Coke, we may remark, considered this clause to refer to all orders of the population equally, including even the villains, who, he argued, although bondsmen in relation to their masters, were free in so far as all others are concerned; but the principle involved in the concession was of more importance, eventually at least, than the extent to which it became immediately operative. The principle was, that the subject had his rights as well as the sovereign, and that those of the one were as sacred as those of the other. There could be no absolute despotism so long as this principle was maintained. Vices in the government and in the constitution there might be still; but, at least, the unlimited power of the monarch was struck down and destroyed for ever. Magna Charta was therefore a great revolution upon the form of government established at the conquest, and which had been maintained ever since that ever since that event. Up to the time of this charter every one of the wrongs which the article we have quoted condemns and declares shall no longer be tolerated, had been in constant use by the crown as engines of extortion and oppression. The actual relief, therefore, which the charter conferred was far from inconsiderable. But it was, in addition to this, the first blow given to the uncontrolled power of the crown established by the Norman conquest—the first advantage which the country gained and made good against the iron rule to which it was then subjected. And even what it left imperfect it gave the means of perfecting. It is upon this rock that the British constitution, as gradually evolved and completed in subsequent times, may be looked upon as having been reared.

The Cathedral of Lichfield.—This cathedral has beauties both in its external appearance and in its interior. It makes no great show when seen from a distance; but it possesses one advantage, in which it is almost singular among such buildings, namely, the open space which it has to a considerable distance around it, enabling the spectator to obtain from the immediate neighborhood nearly a perfect view of it on every side. It stands on a spot which is elevated above the rest of the city, and surrounded by a wall which in former times was fortified, in imitation of the manner in which convents and other ecclesiastical possessions used often, in France and other foreign countries, to be secluded and converted into a sort of forts, or strongholds. This portion of the city of Lichfield is still known by the name of the *Close*, just as in old Paris there were the *Clos* of the Augustines, the *Clos* of the Jacobins, &c. The Close contains a considerable number of houses besides the cathedral, but they neither crowd upon the sacred edifice, as they do in most other cities, nor are they of so mean a description as to



West Front of Lichfield Cathedral.

present a disagreeable or unsuitable contrast in its vicinity. Some old trees ornament the northern side of the lawn, in the midst of which the cathedral stands, which, together with a sheet of water on the opposite side, give something of a rural air to the place.

The cathedral does not stand due east and west, as is usual with sacred buildings, but varies from the right line by an angle of about twenty-seven degrees, or not much less than the third part of a whole quarter of the compass. It is built in the customary form of a cross, the principal bar containing the nave of the church, the choir, and what is called the Lady chapel. The extreme length is 403 feet; the shorter bar, or the transept, is 177 feet long. The width of the nave inside is about 66 feet. The principal front is the west. It is surmounted by two pyramidal spires; and a third, of the same form, rises from the centre of the building. The former are each 192 feet high; the latter rises to the height of 252 feet.

If tradition may be trusted, the spot on which Lichfield stands has a claim to be regarded as one of the most sacred in England. Here it is said a thousand Christian martyrs were put to death at one time, in the persecution which raged in the beginning of the fourth century, under Diocletian and Maximian. A field in the neighborhood, which still bears the name of Christian field, is pointed out as the scene of this slaughter; and etymologists have found a memorial of the same event in the name of the town itself. Lichfield, they contend, signifies, in Saxon, the field of the dead. In the Saxon times Staffordshire was a part of the extensive and powerful kingdom of Mercia, which was Christianized upon its conquest by Oswy, king of Northumberland. Lichfield is said to have been erected into a bishopric in 656; the person first appointed to preside over the see being named Diuma. His immediate successors were Cellach Trumhere, Jaruman, and Ceadda, commonly called St. Chad, who was consecrated in 669, and held the bishopric for two years. He obtained great renown on account of his piety, and for many ages after his death a miraculous atmosphere was believed to surround even the tomb that held his remains. The first cathedral is supposed to have been begun by his predecessor, Jaruman; but it was not completed till the year 700, in the time of Bishop Hedda. About the end of the eighth century the influence of King Offa obtained from the pope the erection of Lichfield into an archbishopric; but it did not retain this dignity for more than two or three years. The diocese was originally one of great extent, comprehending nearly the half of England; but several other bishoprics have been formed out of it in later times. The diocesan used to style himself sometimes Bishop of Lichfield, sometimes of Coventry, having a cathedral, a palace, and a chapter, in each city, till at last the common form came to be Bishop of Coventry and Lichfield. Bishop Hacket, who was appointed to the see immediately after the restoration, changed the order of the two names; and the designation of the diocese ever since has been the Bishopric of Lichfield and Coventry.

The founder of the present cathedral is usually stated to have been Roger de Clinton, who came to the see in 1128. But the style of architecture indicates that very little of what now remains could have been erected by him. Mr. Britton is of opinion that it must have been mostly built in the course of the thirteenth and fourteenth centuries. Fuller tells us, in his Church History, that it was completed in the time of Bishop Heyworth, who came to the see in 1420. No documents, or hardly any, referring to its erection exist: all its records were destroyed either at the time of the reformation, or during the civil wars in the seventeenth century. On the former occasion it was despoiled of all its ornaments which could be easily converted into an

her use; its richly-decorated shrines and gold and silver vessels being all nfiscated to the crown. At the commencement of the civil war, the Close Lichfield was fortified by the royalists, and the command intrusted to the rl of Chesterfield. In March, 1643, the garrison here was attacked by obert Greville, Lord Brooke, a zealous puritan, who is said to have endeaved to invoke the aid of Heaven by a vow, that if he should succeed in his :empt he would level the cathedral with the ground. But on the second the month, which happened to be St. Chad's day, and therefore, we may ıll believe, made the circumstance seem to many a very remarkable judgent, his lordship was shot dead, as he walked along the street below, by a ntleman stationed on the great tower of the church. The garrison, hower, were obliged to surrender on the third day after, when the parliamenty soldiers entered and took possession of the place. These followers of ırd Brooke did not quite throw down the cathedral, but they inflicted upon both desecration and injury to no small extent. They exercised their barrism, says Dugdale, ("Short View of the Late Troubles"), "in demolishg all the monuments, pulling down the curious carved work, battering in ces the costly windows, and destroying the evidences and records belongg to that church; which being done, they stabled their horses in the body it; kept courts of guard in the cross isles; broke up the pavement; * * * d every day hunted a cat with hounds throughout the church, delighting emselves in the echo from the goodly vaulted roof." The parliamentary ces kept possession of the Close till the 21st of April, when they were ain driven out by the royalists. It remained in the hands of the latter till ly, 1646, when it was once more attacked, and compelled to admit a new rrison after a brief resistance. The cathedral suffered greatly from these ccessive sieges. It was reckoned that no fewer than two thousand cannonot and one thousand five hundred hand-grenades had been discharged ainst it; and the effect was that the three spires were nearly entirely bated down, and hardly anything left standing except the walls. Even they ıre everywhere defaced and mutilated.

The restorer of the building was the excellent Bishop Hacket, who was pointed to the see after the return of Charles II. In the course of eight ars, by unsparing exertion and liberality, he had succeeded, as far as it ıs possible, in repairing the sad devastations of the preceding quarter of a ntury. The structure has since, however, undergone considerable alteraıns at various times; and in particular, about the close of the last century received a complete renovation under the direction of the late Mr. Wyatt. The finest parts of Lichfield cathedral are the west front, which is very h and splendid, and the Lady chapel, the painted glass in the windows of ıich, brought from the chapel of the nunnery of Herckenrode, in Liege, ıy probably vie with anything of the kind in England. The church conns a considerable number of tombs, but few of them interesting from their tiquity. Among those of modern date are one to the memory of Dr. Johnn, and another to that of Lady Mary Wortley Montague, who was also a tive of Lichfield. There is also one in commemoration of the two female ildren of the Rev. W. Robinson, which is one of Chantrey's very finest works.

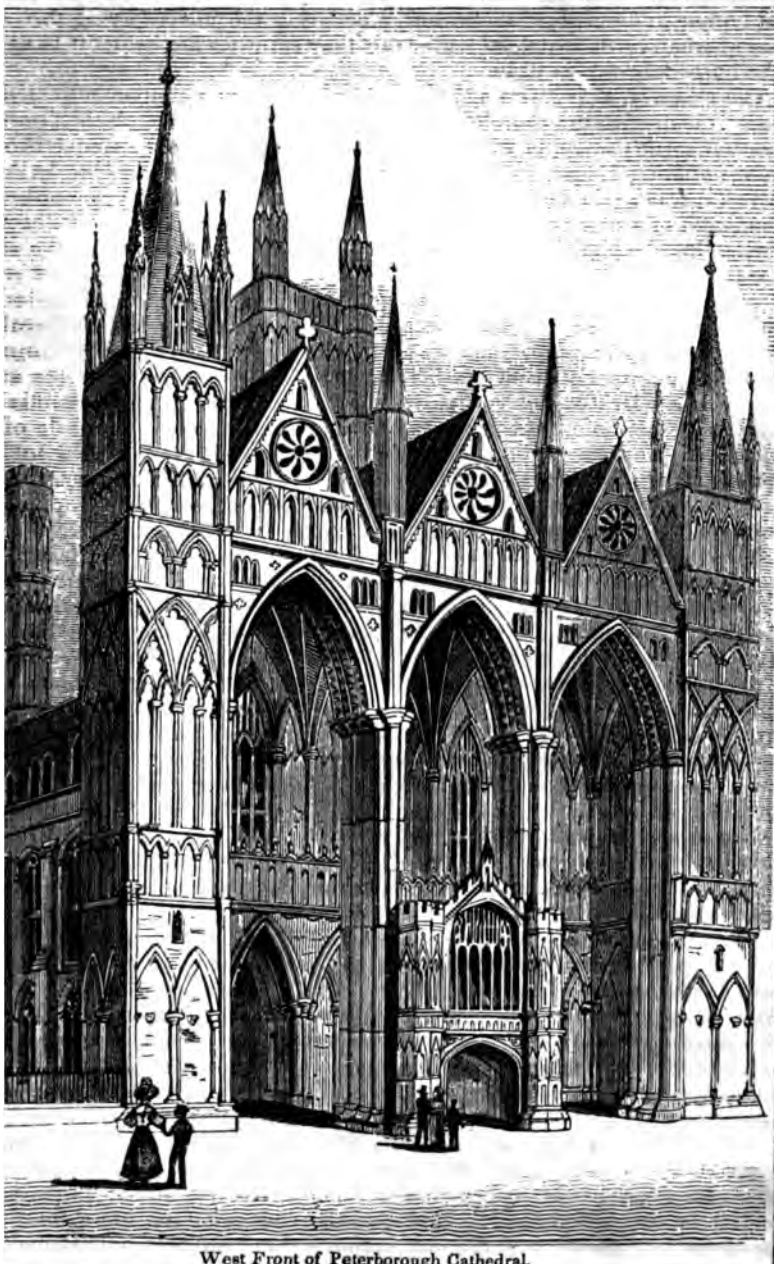
Peterborough Cathedral.—The cathedral of Peterborough possesses e advantage of nearly standing apart from every other building. With the ception of some of the prebendal houses, which abut upon the southern rmination of the transept, the ground is clear for a considerable space ound it on all sides. The old churchyard—long the only one in the city, d consequently crowded with tombstones—encompasses its eastern exmity, and extends along part of both the north and south sides. About

ten or twelve years ago the authorities of the cathedral began to lay out this ancient and extensive cemetery in a manner somewhat similar to that of La Chaise at Paris, planting it with laurels, pines, willows, and other trees, shrubs, and flowers. These operations, which were carried on for some years, have been executed with great taste, and have proved in a high degree ornamental to the aspect of the cathedral. Before the western front is a spacious court, which is also now neatly laid out in grass-plats and gravelled walks, while rows of ancient elms combine with the noble architecture of other times, by which it is on all sides surrounded, to preserve to it an air of majesty in keeping with the sanctity of the spot. In the centre of the wall opposite to the cathedral is a turreted gate, leading to the city, and forming the entrance to the sacred precincts; in the south wall is another, which conducts to the episcopal palace; and in the north wall is a third, that of the deanery. All the three are rich and imposing structures. The site of the cathedral not being elevated above that of the surrounding country, which indeed is a dead flat for many miles, the building can not be seen from a very great distance; but its great extent, and the height of its towers, make it a conspicuous and remarkable object from every point from which a view of the city is to be obtained. Its pinnacles and spires shoot from the foliage in which they are embosomed far beyond all the surrounding buildings.

Like the generality of the other English cathedrals, that of Peterborough consists of a nave with side aisles, terminated at the east end by a choir, the further extremity of which is circular, and crossed at the middle by a transept. There is also in this instance a much smaller transept at the west end. From the centre, where the nave and the transept cross each other, rises the great lantern-tower, to the height of above one hundred and eighty-eight feet. Over the two extremities of the west end are two other spires of less elevation, and one of which indeed (that to the south) appears never to have been completed. According to a measurement taken more than half a century ago, the length of the whole edifice from east to west is about four hundred and eighty feet, of which the nave occupies two hundred and thirty-one feet, and the choir, from the door to the altar, one hundred and thirty-eight. The breadth of the nave is ninety-one feet, and its height seventy-eight. The great transept is two hundred and three feet in length, and sixty-nine in breadth.

The character of the architecture of this cathedral is, upon the whole, rather majestic than picturesque. Everything is in the most massive style. In the interior the pillars, which are not numerous, are of great circumference, and present an appearance of solidity and strength corresponding to the ponderous pile which they help to sustain. The most highly-ornamented part of the exterior is, as usual, the west front. It is divided into three compartments, formed by so many lofty arches, in the central and narrowest of which is the great door, surmounted by a projecting structure called the Chapel of St Thomas-à-Becket, having a tower with pinnacles on each side of it. The effect of this façade, which is one hundred and fifty-six feet in breadth, while the height of the arches is eighty-two, is in the highest degree grand and imposing.

Peterborough, originally called Medeshamsted, from the meadows on both banks of the river Nen, in the midst of which it was placed, was at first a monastery, the foundation of which is said to have been laid by Peada, king of Mercia, son of the famous king Penda, about 655. An old monkish writer states that the stones which were employed in laying the foundations were many of them so large that they could hardly be drawn by eight pairs of oxen. But the buildings erected by Peada, and by his two younger brothers,



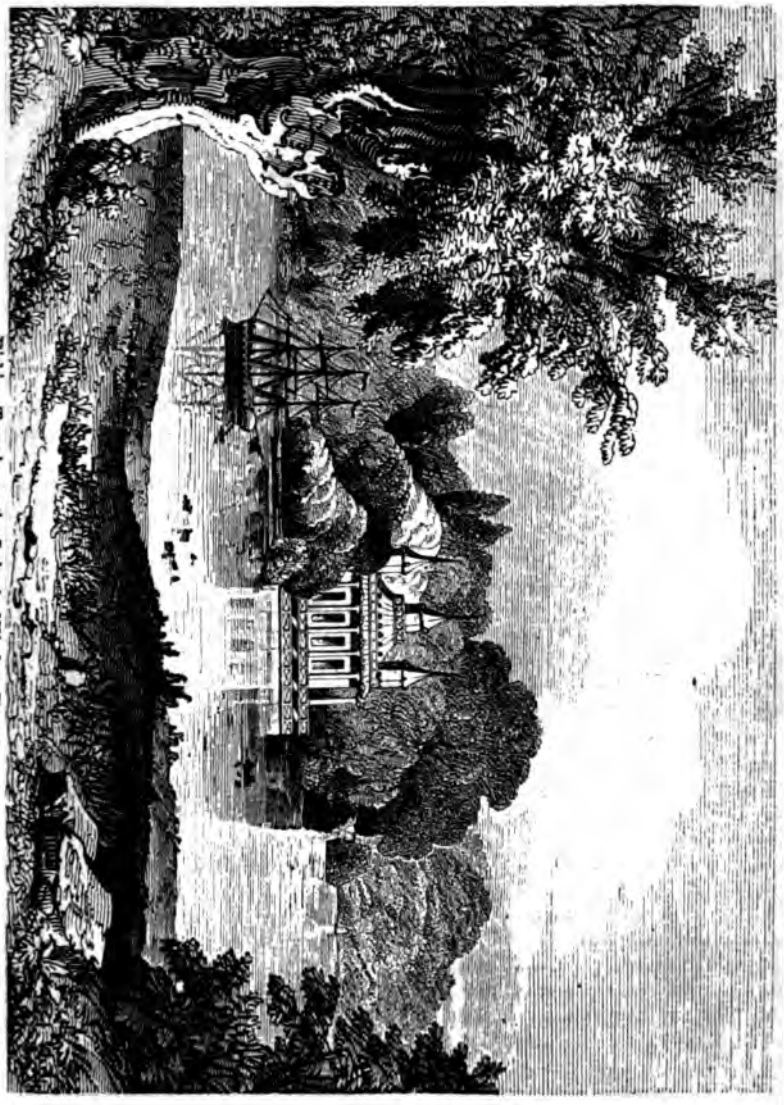
West Front of Peterborough Cathedral.

Wulfer and Ethelred, who succeeded him on the throne, were reduced to ruin in 870 by the Danes, who, under the command of Earl Hubba, made a furious attack upon the place, and put the Abbot Hedda, and his monks, eighty-four in number, to the sword, plundering the monastery at the same time of whatever it contained; after this they set it on fire, when it is said to have burned for fifteen days.

The monastery lay waste and uninhabited for about a century after this calamity, the area of the church coming at last to be used as a place of confinement for cattle; when, in 966, its restoration was commenced, under the patronage of King Edgar, by Athelwold, bishop of Winchester. The building, however, was again burnt down by accident in 1116. Two years after, the foundation of a new church was laid by the abbot, John de Sais, or Seez (or, as Gunton calls him, John of Salisbury), who was a Norman; and the structure thus begun is supposed to be the present cathedral. The part which John de Sais built was probably the east end. The work was carried on with more or less zeal by his successors; but the records of their several additions are very imperfect, and we are left to conjecture the age of some of the most important parts of the building, merely from the style of the architecture. Mr. Britton thinks that, with the exception of some unessential appendages, the whole must have been completed by about the middle of the thirteenth century. It is a curious fact that, although glass is said to have been introduced into England before the end of the seventh century, the windows of the cathedral of Peterborough are described, more than five hundred years after this time, as only stuffed with reeds and straw.

Virginia Water.—The district of Windsor forest called Virginia Water was planted, and the lake formed, under the direction of Paul Sandby, at a time when Duke William of Cumberland resided at the lodge which bears his name, about three miles from Windsor. The lake is the largest piece of artificial water in the kingdom—if artificial it can be called: for the hand of man has done little more than turn the small streams of the district into a natural basin. The grounds are several miles in extent, although so perfectly secluded that a traveller might pass on the high-road without being aware that he was near any object that could gratify his curiosity. They are now covered with magnificent timber, originally planted with regard to the grandest effects of what is called landscape gardening.

The scenery in the neighborhood of Virginia Water is bold and rugged, being the commencement of Bagshot heath. The variety of surface here agreeably relieves the eye, after the monotony of the first twenty miles from London, which equally fatigues the traveller either upon the Bath or western road. A branch road to the right leads to a remarkably pretty village called Blacknest, nearly two miles from the high-road. Here is a keeper's lodge, and the persons at the gate will readily give admission to Virginia Water. After passing through a close wood of pines, we come to some "alleys green" which lead in different directions. Those to the right carry us up a steep hill, upon the summit of which is a handsome building called the Belvedere. Those to the left conduct to the margin of the lake. A scene of great beauty soon bursts upon the view. A verdant walk, bounded by the choicest evergreens, leads by the side of a magnificent breadth of water. The opposite shore is covered with heath; and plantations of the most graceful trees—the larch, the ash, and the weeping birch ("the lady of the woods")—break the line of the more distant hills. The boundary of the lake is everywhere most judiciously concealed; and the imagination can not refrain from believing that some great river lies beyond that screening wood. Every now and then the road carries us through some close walk of pines and laurels, where the rab-



Fishing Temple, on the Lake in Windsor Forest.

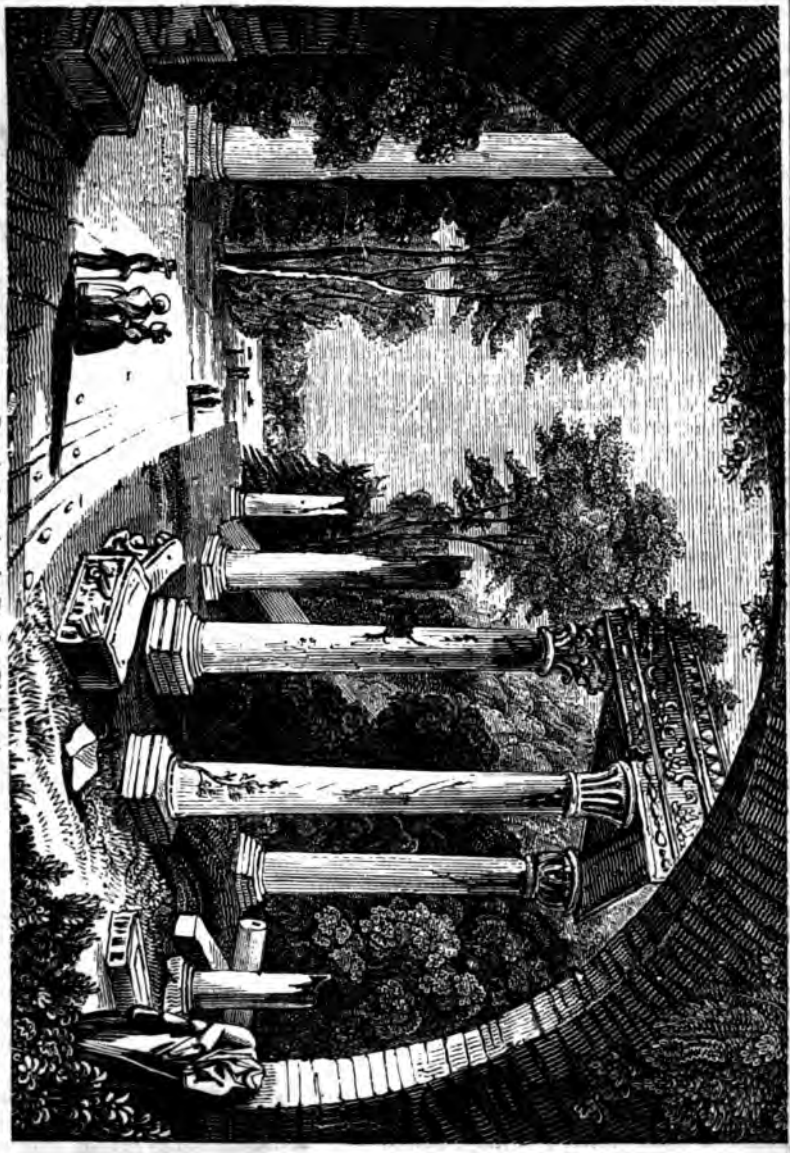
bit and squirrel run across with scarcely a fear of man. But we again find ourselves upon the margin of the lake, which increases in breadth as we approach its head. At the point where it is widest, a fishing temple was erected by George IV., which, as seen from the shore we are describing, is represented in our engraving, page 457.

The public road to Blacknest is carried over a bold arch which is not far out of the line of our walk. This is a singularly beautiful spot. To our minds it is not now so much in accordance with the general character of the scenery as it was some ten years ago. Several antique fragments of Greek columns and pediments, that used to lie in the courtyard of the British Museum, now form an artificial ruin, as represented in the engraving, page 459. *Real ruins* removed from the sites to which they belong, are the worst species of exotics. The tale which they tell of their old grandeur is quite out of harmony with their modern appropriation. We can look with an antiquarian interest upon a capital in a cabinet. But a shaft or two perched up in a modern pleasure-ground, produces a ludicrous struggle between the feeling of the true and the artificial; and a sort of scorn of the vanity which snatches the ruins of the dead from the hallowed spot where time or the barbarian had crumbled them into nothingness, to administer to a sense of what is pretty and *merely* picturesque. A *real* ruin is a solemn thing, when it stands upon the site where it had defied the elements for centuries, in its pomp and glory; but a mock ruin—a fiction of plaster and paint, or a collection of fragments brought over sea to be joined together, without regard to differences of age and style—are baubles.

A walk from this spot of a quarter of a mile brings us to the cascade at the head of the lake. Cascades are much upon the same plan, whether natural or artificial; the scale alone makes the difference. This cascade is sufficiently large not to look like a plaything, and yet it gives but an imperfect notion of a fine natural cascade. It wants height, and volume of water. In the latter particular of excellence, however, the grandest cascades are often very disappointing. After a mountain-storm, when the *gills* (little runnels) sparkle down the sides of the barren rocks, and the *force* leaps over some fearful chasm in one unbroken sheet, cascades are worthy of the poetical descriptions which have been so often lavished upon them. In other seasons they appear but feeble additions to the charms of the mighty lakes and solemn mountains amid whose solitudes they are found.

From the bottom of the cascade a road has been formed to the bank of the lake, opposite that which we have been describing. The walks here are as verdant and as beautiful as those we have left. We reach a rustic bridge, and cross one of the streams that feed the lake. Here we are in a more wild and open country. We may trace the course of the little stream among the underwood; or strike into the path which leads to the village of Bishopgate. The finest woodland scenery, and spots of the most delicious seclusion, where nothing is heard on a summer noon but that indescribable buz with which every lover of solitude is familiar, will amply repay for a lingering hour. Bishopgate is a beautiful spot, surrounded by the most delightful varieties of hill and dale, of wood and water. The poet Shelley, who had a true eye for the picturesque, resided for some time here.

Exeter Cathedral.—The cathedral of Exeter, although, as will be seen, a considerable period elapsed between the commencement and the completion of the building, is remarkable for the uniformity of the architectural character which it presents throughout. The plan of its founder, although he was himself only able to execute it in part, appears to have been taken as their guide by all those who continued the structure after him. Its pervading style



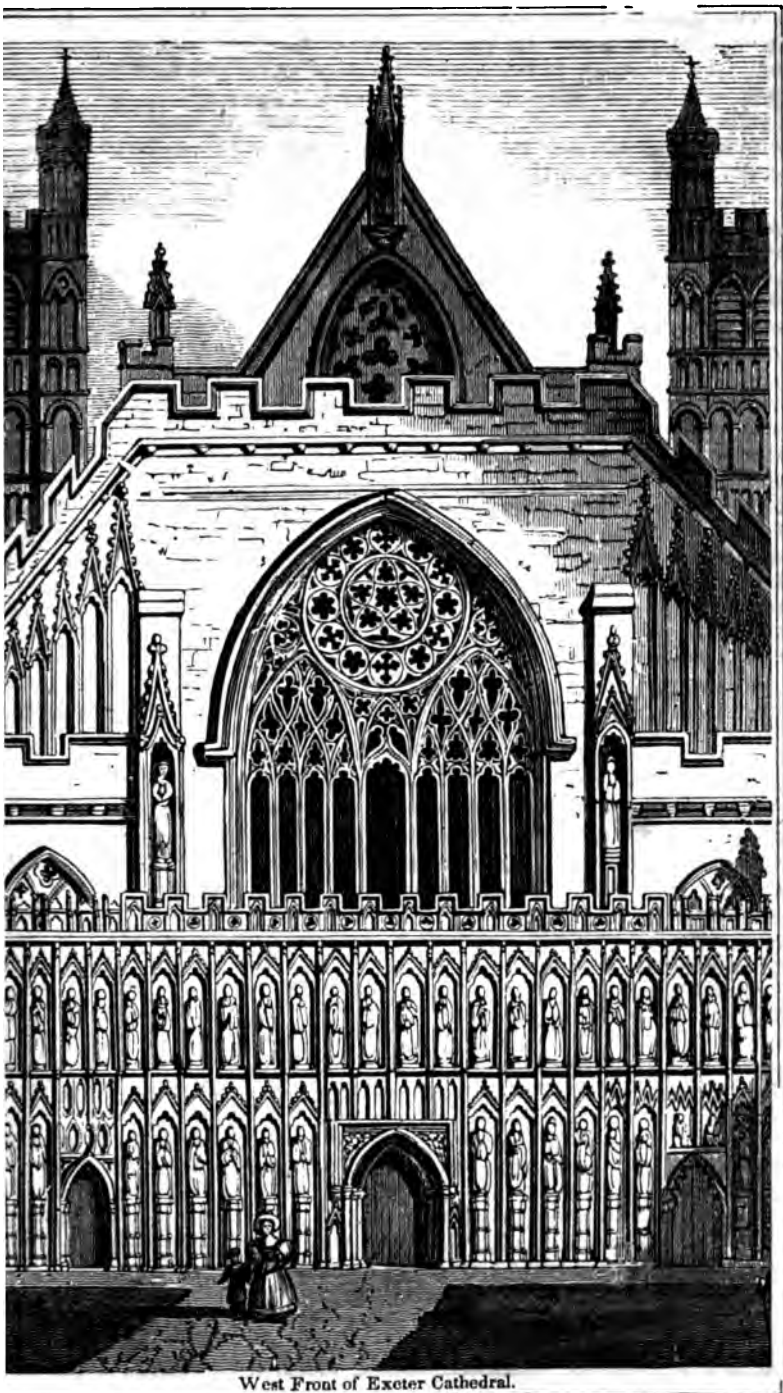
Dry Arch, under the Road to Blackmoat.

is what may be called the middle Gothic—without anything either of the rudeness of the Saxon and the heaviness of the earliest Norman style on the one hand, or of the extreme lightness and florid ornament which distinguish the latest stage of Gothic architecture.

The nave and choir of the church, together with the lady chapel, to the east of the latter, make a length of about four hundred and eight feet in all. The nave with its aisles is seventy-six feet in breadth, and is crossed by a transept, which, however, only extends about thirty feet beyond each of the side walls, the two projecting portions being formed each of the basement story of a great square tower, which has been arched out for that purpose. The height of each of these towers, which are massive structures, surmounted by pinnacles at the four corners, is about one hundred and thirty feet. Buttresses, which rise into pinnacles, are placed in thick succession, both along the north and south sides and around the ends of the building, giving to the upper part of it considerable richness of effect.

The west front, however, is the most highly-ornamented portion of the exterior. The form of the façade is peculiar, consisting of a broad-based triangle, elevated upon a parallelogram, so as somewhat to resemble a modern gable. Along the two ascending sides of the triangle rise a series of lofty and fancifully-decorated pinnacles, under the central one of which, crowning the apex of the fissure, is a window, filled with stained glass, of magnificent dimensions, and terminating in a pointed arch. Under this is the great central door opening into the nave, and to the right and left of that are the two aisle doors. All the rest of the wall is covered by a rich display of sculpture, consisting mostly of statues in niches, ranged in a series of tiers, and representing a vast number of scriptural characters—kings, prelates, and other persons of eminence. Time has now obliterated the finer features of this elaborate design; but the throng of figures, though they do not appear to have been executed by any means in the best style of Gothic sculpture, still make a highly-imposing show.

The interior of this cathedral, however, is what merits the most admiration. The great height of the nave, nearly seventy feet—the boldly-ribbed roof—the clustered columns, of which there are seven on each hand, with the lofty arches that rise between—the handsome stone screen, which conceals the choir—and the numerous monuments, many of them of beautiful antique workmanship—are displayed to great advantage by the abundant light that is admitted through the great western window and the others of smaller dimensions ranged along the north and south walls. The transept is also lighted by two magnificent windows, which have been cut out in the walls of the great towers that form its extremities. Near the middle of the north side of the choir is a singular erection, of which, we believe, there is no other example in the cathedrals of England, but which is not unfrequently found in continental churches—a gallery which appears to have been designed for a kind of orchestra, or a place of accommodation for a band of instrumental musicians. It is supported by thirteen pillars, between each two of which stands, in a niche, the figure of a person playing on a musical instrument. Among the instruments are guitars, citterns, horns, flutes, &c. It still retains the name of the "Minstrels' Gallery." The entire length of the nave is about one hundred and seventy-five feet. The choir is about one hundred and thirty feet long. On its south side stands the bishop's throne, surmounted by a lofty pyramidical canopy, of a light and highly-fanciful style of Gothic carpentry. An elegant stone screen is now placed behind the altar in place of a former one which was of wood. Here, also, are several ancient monuments, and monumental chapels, of the richest workmanship.



West Front of Exeter Cathedral.

The present edifice was begun early in the twelfth century, by Bishop William Warlewast. All that he erected, however, was so much injured soon after his death, in the course of a siege of the city by King Stephen, in 1136, that his successor, Bishop Chichester, found it necessary to commence a reparation of the cathedral on the most extensive scale. The work was continued by the next three bishops, and was not completed till the time of the fourth, Bishop Henry Marshall, who died in 1206.

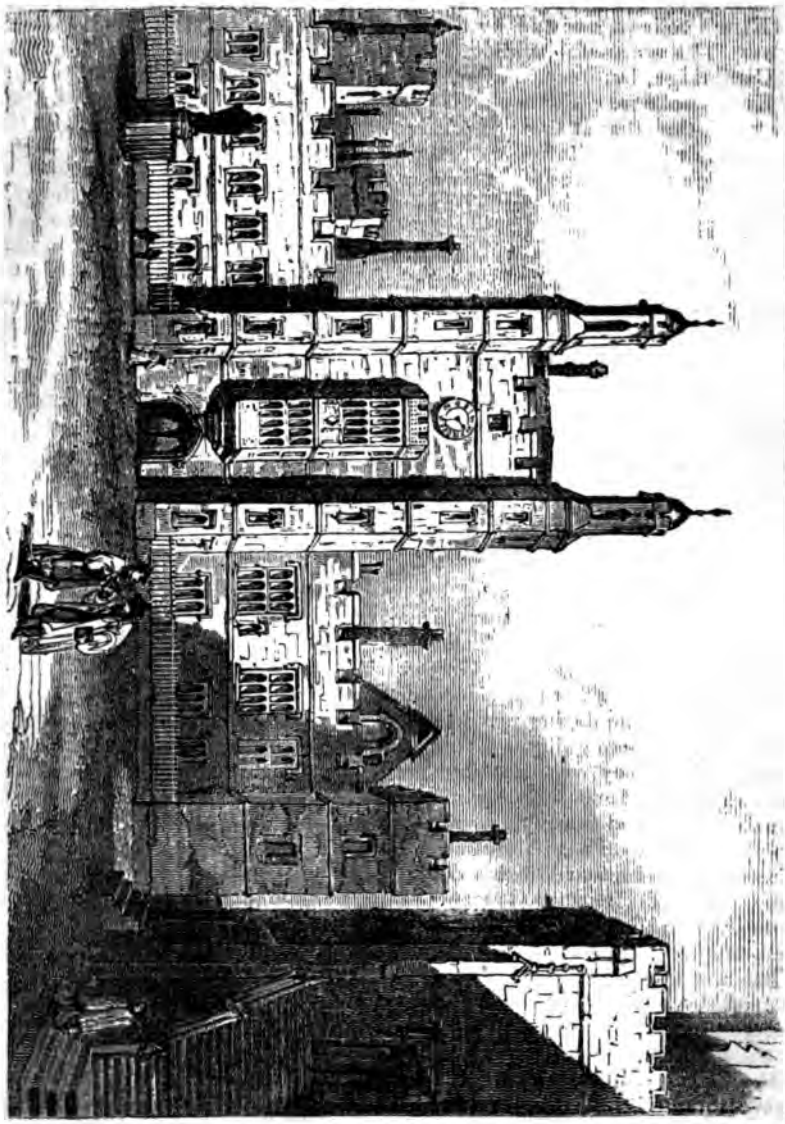
The cathedral of Exeter is remarkable for its organ, its bells, and its ancient astronomical clock. The clock is in the north tower, and is said to have been the gift of Bishop Courtney, who occupied the see from 1478 to 1487. Mr. Britton, however, in his "History of Exeter Cathedral," has referred to some ancient authorities, from which it would appear that there was a famous clock here at least a hundred years before the time of Bishop Chichester. The present clock, besides the hour of the day, indicates the age of the moon, and represents the revolution of that luminary around the earth. Its face is seven feet in diameter. In the north tower is also the famous bell, called the "Peter," the largest in England except "Great Tom" of Christ's church, Oxford. The bell at Christ's church weighs seventeen thousand lbs., and this is said to weigh twelve thousand five hundred. Unfortunately, the Exeter bell is now so hung that it can not be rung. It, as well as the clock, is said to be the gift of Bishop Courtney, but it is probably of still greater antiquity. The tradition is, that it was brought from the cathedral of Llandaff. Having been cracked on the 5th of November, 1611, it was recast in 1676. The organ is said to be the most powerful in Europe, except that at Haarlem, and even to that it is considered to be superior in sweetness of tone. It was built by an English artist in 1665.

Eton College.—At the further extremity of the town of Eton, and separated from it, stands the college. The buildings of this institution—the

——"antique towers,
That crown the watery glade"—

show best from a distance, where they are set off by the natural beauties of their situation. They form a conspicuous and highly-ornamental object in the splendid view from the terrace of Windsor castle. Seen from their immediate neighborhood, they are not very imposing. They consist of two quadrangles, built partly of freestone, but chiefly of brick, in a style somewhat resembling that of the north front of St. James's palace. In the one quadrangle are the school and the chapel, with the lodgings for the scholars; the other contains the library, the provost's house, and the apartments of the fellows. The chapel, which is built of stone, is the part in which the architecture is most ambitious; it is externally a handsome structure, though very plain in the interior. It is one hundred and seventy-five feet in length, including an ante-chapel which is sixty-two feet long. In the centre of the first-mentioned quadrangle stands a bronze statue of Henry VI., which was erected in the early part of the last century by Dr. Godolphin, the provost of the college. There is another statue of the same king in the chapel, the work of the late John Bacon.

Eton college was founded by Henry VI. The foundation charter is dated at Windsor, on the 12th of September, in the nineteenth year of his reign—that is, in the year 1440. The original establishment was a provost, ten priests, four clerks, six choristers, twenty-five poor grammar-scholars, and the like number of poor men. It now consists of a provost, six other fellows, two schoolmasters, two conducts, seven clerks, seventy king's scholars, ten choristers, and a number of inferior officers and servants. Besides the scholars



Quadrangle of Eton College.

on the foundation, the school is always attended by a much larger number of others, called oppidans. The oppidans generally amount to between three and four hundred, and have exceeded five hundred.

From the seventy king's scholars a certain number are annually selected and put on roll for admission to King's college, Cambridge. The selection is made, after examination of the upper class, by the provost and two fellows of King's college, assisted by the provost, vice-provost, and head-master, of Eton. The successful candidates, however, are not immediately transferred to Cambridge, but remain at school until vacancies occur on the foundation of King's college. The supply is prevented from outrunning the demand by the regulation that at the age of nineteen an Etonian is superannuated, as it is called, or is not allowed to remain longer at school. On their removal to Cambridge the Eton scholars are received on the foundation of the college and maintained from its funds; and after three years they succeed to fellowships. Here, then, is an opportunity by which the poorest man's son may obtain the best education which the country affords, and be put on the road to the highest preferments in the national church.

Hampton-Court Palace.—In the early part of the thirteenth century the manor of Hampton Court became the property of the powerful community of military ecclesiastics, the "Knights Hospitallers of St. John of Jerusalem." From the prior of this order a lease of the place was obtained, about the year 1515, by the famous Wolsey, already archbishop of York, lord high chancellor of England, cardinal, legate à latere, and rapidly mounting to the zenith of his greatness. The palace of Hampton court owes its origin to this lordly spirit:—

> "He was a man
> Of an unbounded stomach, even ranking
> Himself with princes."

In projecting this monument of his taste and splendor, he might be said to aim at overtopping even his royal master. Numerous as then were the residences of the king of England, there was no one—neither Windsor, nor Richmond, nor Eltham, nor Greenwich, nor Whitehall, nor St. James's—that could vie with the magnificence of that which was rising under the hand of Wolsey. The daring projector was soon made to feel the imprudence of which he had been guilty. The structure, we are told, excited great envy at court, and Wolsey was asked by Henry himself what he meant by building a house so much finer than any of the royal palaces. The aspiring minister, thus suddenly and sharply reminded of whose breath he was the creature, had only one part to take: he replied to his majesty's question, that it was not for himself he had erected such a dwelling; that if the gift might be accepted, the palace of Hampton Court was intended for his sovereign. Had Henry not obtained his object in this easy and smooth way, he no doubt would have resorted to rougher means. However, the cardinal did not go unrequited. The king took the palace, but "in recompense thereof," says Stowe, "licensed him to lie in his manor of Richmond at his pleasure, and so he lay there at certain times."

This happened in the year 1526. The place afterward became the favorite residence of Henry; and it has also been inhabited by many of his royal successors. Yet it is the name of Wolsey that still gives its chief historical interest to the spot. Not one of its crowned possessors has left a memory within its courts and halls that either fills the imagination or lives in popular tradition like his. Call it genius, or early fortune, that lifted him to his airy height; there was a force and power in this man's meteoric course, the dazzle of which is not yet out of the eyes of his countrymen. There was a lofty

Middle Quadrangle of the Palace of Hampton Court.

and soaring magnificence in Wolsey's nature, which, despite of all his faults and vices, threw a glory around him. Nor was he probably without some amiable qualities, and some points that merited esteem from the coldest reason.

The palace projected and, in great part at least, erected by Wolsey, consisted of five quadrangles. Of these only two now remain, the site of the other three being occupied by the new buildings, forming what is called the "Fountain Court," which were added by Sir Christopher Wren, in the reign of William III. Here are the suite of state-rooms, the gallery containing the famous cartoons of Raffaelle, and the principal apartments which have been inhabited by the royal family in modern times; but this portion of the palace neither corresponds in architectural character with the ancient design, nor has much pretension to superior elegance in itself.

The "Fountain Court" forms the eastern division of the palace. The grand front looks toward the west; and, although injured in character and effect by the introduction of modern windows among the fanciful and picturesque forms of the original design, is still a handsome elevation. The quadrangle immediately within the gate, called the "Entrance Court," is supposed to be the most ancient part of the building. Here, there can be little doubt, we have Wolsey's own work. The apartments surrounding this court are for the most part tenanted by private families, to whom the privilege of residing here is granted by the crown. It is stated in the guide-books that, including servants, the number of persons thus lodged in the palace is not less than seven hundred; but, judging by the deserted appearance of the place, it is difficult to believe that it can be the nest of so large a population. One of the rooms in this court is interesting as having been the sleeping-chamber of Charles I. after he was brought here by the army on the 24th of August, 1647. The few weeks which he spent at Hampton Court between this date and the 11th of November, when he made his escape to the isle of Wight, witnessed the unhappy monarch's last exercise of the semblance of royal authority. "He lived for some time," says Hume, "in that palace, with an appearance of dignity and freedom. Such admirable equability of temper did he possess, that, during all the variety of fortune which he underwent, no difference was perceived in his countenance or behavior; and, though a prisoner, in the hands of his most inveterate enemies, he supported toward all who approached him the majesty of a monarch; and that, with neither less nor greater state than what he had been accustomed to maintain. His manner, which was not in itself popular or gracious, now appeared amiable, from its great meekness and equality." The room in which he is said to have slept is a small octagonal closet, with an iron door. Cromwell is asserted to have made the same apartment his bedchamber, the security afforded by the iron door inducing him to prefer it to a more spacious room. And it has also the credit of having been Wolsey's oratory; a tradition to which some remains of paintings on the walls, representing the Last Supper and other scriptural subjects, have probably given origin. It is now—

"To such base uses may we come, Horatio"—

used as a pantry.

The next quadrangle, called the "Middle Court," is also a part of the ancient palace A conspicuous object on one of the sides of this court is an ancient clock, which was long said to have been made by the famous Tompion, but appears to be the work of another artist, Lindsay Bradley, who lived about the beginning of the last century. The date on it is 1711. But the object of greatest interest here is the "Great Hall," which is on the

north side of the court: this is a noble room, one hundred and four feet in length by forty in breadth, with a rich Gothic roof and a splendid oriel window. In 1527, an entertainment of extraordinary splendor was given, by order of Henry VIII., to the French embassador in Hampton-Court palace: Wolsey, who had the year before presented the palace to the king, having been commanded to preside over both the preparation and the solemnization of the festivities. On this occasion the magnificent cardinal seems to have exhausted his ingenuity to furnish out a succession of the most sumptuous revelries for the gratification and wonder of his guests. A long and minute account of the whole affair has been given by his biographer Cavendish.

Place de Bruges.—Bruges, the chief city of West Flanders (East and West Flanders constitute a portion of the kingdom of Belgium), was a very flourishing place in the fourteenth and fifteenth centuries. It was a centre of the commerce of the then active and enterprising Flemings, and in fact of Europe. The merchants of Venice and Genoa conveyed thither the produce of Italy and the Levant; and the tapestry of Bruges was long famous and eagerly sought after. The corporation of the weavers is said, in its best days, to have consisted of upward of fifty thousand individuals; and the number of different incorporated trades is affirmed to have been sixty-eight. It contained seventeen consular houses, where the interests of merchants of different countries were attended to; and the proud nobles of Burgundy were not ashamed to mingle with the wealthy citizens. It was in Bruges that the celebrated order of knighthood, the Golden Fleece, was instituted, on the occasion of the marriage of Philip the Good with Isabella of Portugal. As a proof of the consideration in which the merchants of Bruges were held, it is recorded that on the captivity of Jean, count of Nevers (surnamed *sans peur*, or the Fearless), who had gone in 1396 to aid Sigismund, king of Hungary, against the Turks under Bajazet, a single citizen of Bruges was readily accepted as security for the payment of the count's ransom, which was two hundred thousand ducats. Charles V., at the age of sixteen, was inaugurated at Bruges, as count of Flanders, in the year 1515.

One cause of the decay of Bruges was the turbulent conduct of the people. They became proud and impatient of control; and frequent insurrections, with their consequences—sieges, heavy fines inflicted on the town, and other punishments—drove away capital and commerce. But in justice to the Brugeois, it must be stated that the oppressive conduct of rulers, or their attempts at exactions, were among the causes of the insurrectionary conduct of the people. Commerce has a tendency to make people active and impatient of control: but unless law and order are well established, the wealth which commerce brings is a temptation to powerful and needy lords. Another cause of the decay of Bruges was that which, wherever it prevails, ruins those who fancy that it enriches them—the spirit of monopoly. The town suffered also very severely from the long-continued and bloody struggle between the prince of Orange and Philip of Spain. In subsequent years various attempts were made to revive its trade and commerce; but Flanders was too often the theatre of war to receive any permanent benefit from these endeavors. Latterly Bruges has revived considerably, the population is increasing, and M. Delepierre, the author of a guide to Bruges, published in 1837, expresses a hope that there may yet be prosperous days for the Brugeois.

Bruges contains many indications of its ancient importance and opulence. It numbers about fifty thousand inhabitants, contains nearly two hundred streets, and is intersected by canals, over which there are upward of fifty bridges. The canal from Ostend to Bruges allows of the passage of vessels

from two to three hundred tons, and there is a wet dock, a dock for the building and repair of vessels, and warehouses for receiving goods. The manufacture of linens, lace, woollens, and cotton goods, with other branches of industry, are carried on.

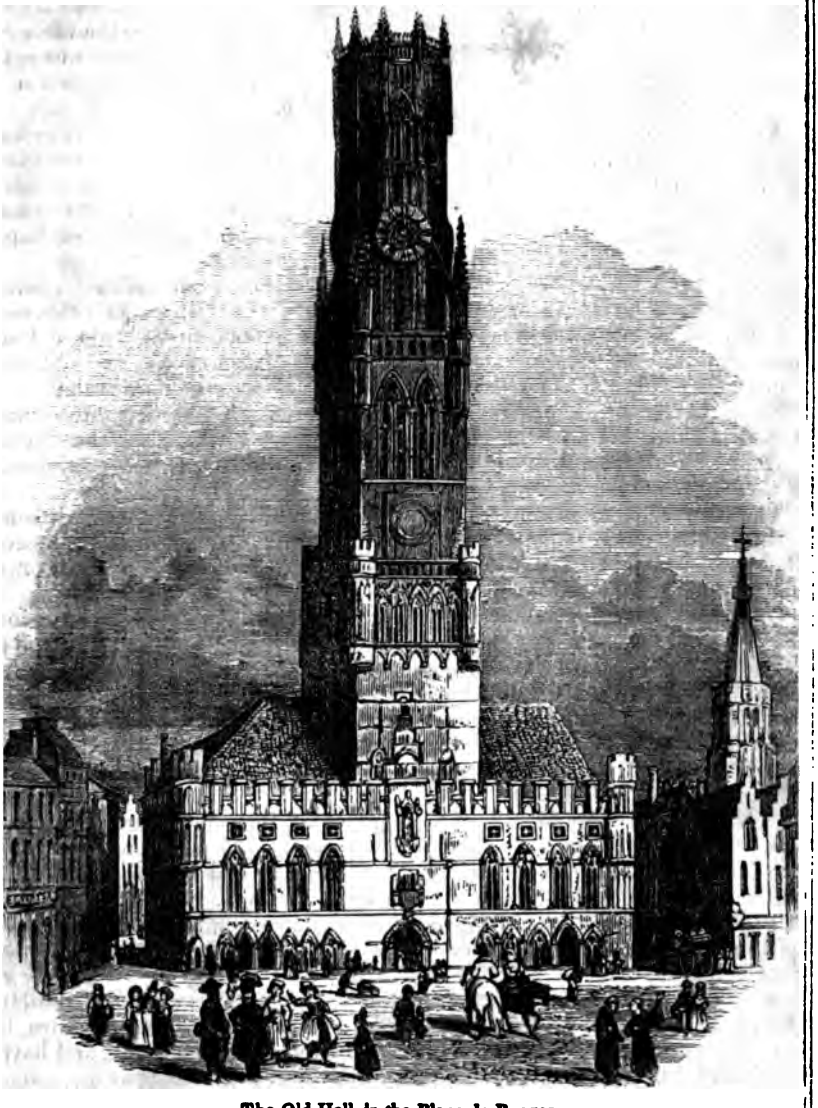
Our engraving represents La Halle, "the Hall," sometimes called the Old Hall, the origin of which is traced to the latter part of the thirteenth century. It was built by the merchants as an emporium or dépôt. The original building was consumed by fire in 1280, and subsequent buildings were burnt (set on fire each time by lightning) in 1493 and 1741. The present building is a Gothic edifice, surmounted by a handsome tower, in which is a set of forty-seven bells, which M. Delepierre terms the best chimes *(carillon)* on the continent. The wings of the building are occupied as a public meat-market, by the officers of the municipal customs, and by the town guard. A court in the centre serves as a linen-market. Over these is an immense gallery, where an annual fair is held in the month of May.

"The large and handsome Place de Bruges," says M. Delepierre, "besides several buildings of considerable architectural beauty, contains two public edifices more particularly remarkable, the Cloth Hall and the Old Hall. The Cloth Hall was formerly called Water Halle, having been built over a canal, in which vessels could sail under the arched galleries for the purpose of loading and unloading. The old building was replaced in 1787 by the present building, which occupies the entire east side of the Place."

The other public buildings of Bruges are the Hôtel de Ville, which contains the public library, the Palais de Justice, the Academy of Fine Arts, the cathedral, churches, &c., which are adorned with various works of art. The Palais de Justice was built in 1722, on the site of an old building, which had been the palace of the counts of Flanders, and which had been given up to the magistrates by Philip the Good. Several relics of the old building are preserved in the present Palais de Justice, among which is an old chimney-piece, carved in wood, of admirable workmanship, which is in the room where the magistrates hold their sittings. The bas-reliefs of the frieze are in white marble, and represent the apocryphal story of Susannah. Statues in wood represent Charles V. with the globe and sword of justice, Maximilian and Mary of Burgundy, Charles the Bold, and Margaret of England, his third wife; with escutcheons, containing the arms of Spain, Burgundy, Brabant, Flanders, &c.

Residence of the Hon. David Sears, Boston.—Thus far we have spoken of the celebrated places in the Old World. America likewise presents much that is hallowed by history and association—many edifices, the residences of men of noble spirit and generous hearts, distinguished for their patriotism, public spirit, and philanthropy—for their love of their fellow-men, and for the benefits conferred by them on the community among whom they dwell.

In the good old city of Boston, distinguished for its Faneuil Hall and Bunker's Hill, is the residence of the Hon. David Sears (a view of which we give on page 471), a gentleman of large landed property, distinguished among those remarkable men of Boston to whom the literature and charities of the country owe so much. It overlooks the pride of Boston, its Common, a large and beautiful public square, in the western part of the city, lighted by gas, encircled by an iron fence, and extending down the long and gentle slope of Beacon hill. It contains about forty-three acres, exclusive of the malls which surround it, and the botanic garden west of it, the whole comprehending at least seventy-five acres of open land dedicated to the public. In spring and summer, when covered with a coat of verdant grass, and while the numerous fine trees which shade it are in full foliage, the sight is remarkably striking, and can not be contemplated without admiration, as one of the largest and most beautiful public grounds



The Old Hall, in the Place de Bruges.

in America. Being slightly relieved by several swells and depressions, it is remarkably well adapted to the manœuvring and encampment of troops, to which it is devoted on days of military display. It was originally dedicated to this purpose, and was afterward used for the pasturing of cows, as appears from the recorded depositions of some of the oldest inhabitants, taken before Governor Bradstreet in 1684. In the centre of this park there is a beautiful piece of water, known by the name of "Frog-pond," of about half an acre in extent, and enclosed by edge-stones of hammered granite. It is the intention of the city government—on the introduction of pure water into the city, the works of which are already in a state of great forwardness—to erect a *jet d'eau*, twenty feet high, in the broadest part of it.

Near this pond, and south of it, stands the celebrated old elm, which for nearly two centuries has triumphed over the heats of summer and the blasts of winter, and under whose shade were formerly held the drumhead courts-martial of military law, and the parades of military executions; but more recently it has been selected as the appropriate spot for meetings of happy children for their holyday sports.

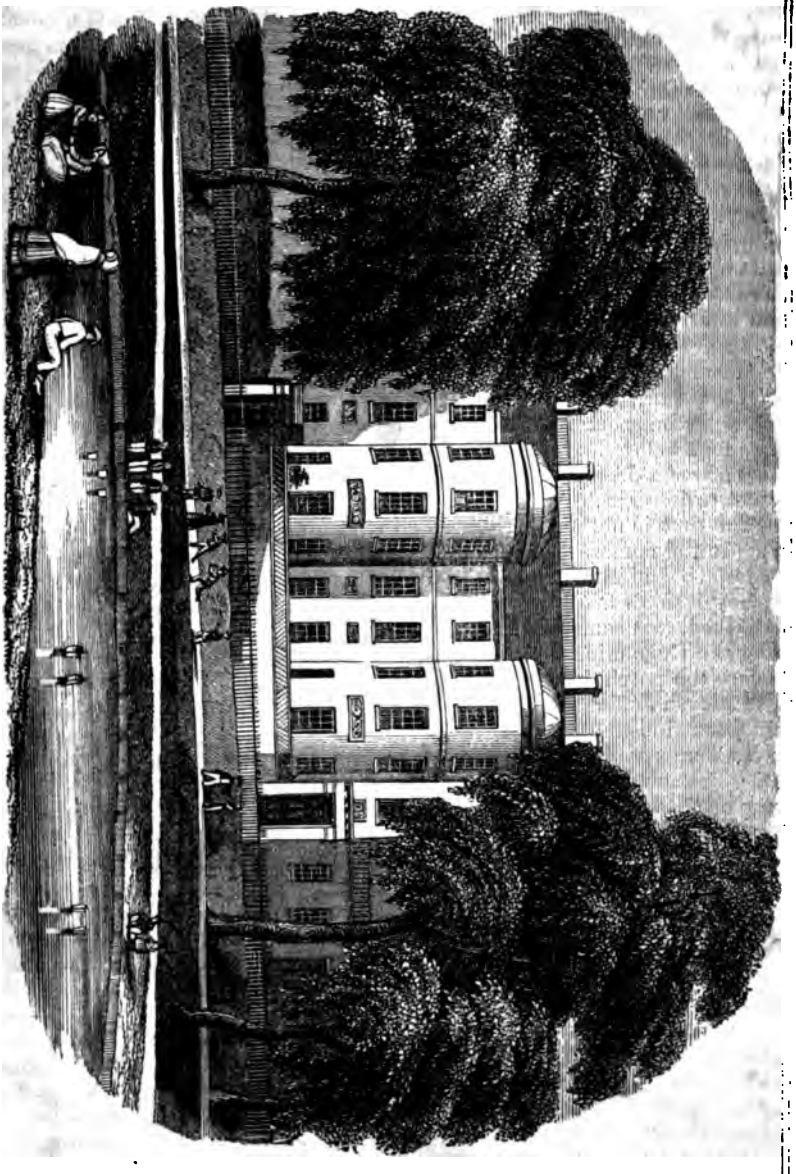
Before 1733, rows of trees had been planted on some parts of the common, as, in that year, it was resolved that more should be planted. In 1739, posts and rails were set up "from the granary in Common street," where Park-street church now stands, "to Beacon street." Many of the fine old elms which now shade the old granary "mall" are probably of the number.

Since that time the trees have been greatly multiplied, so that the common is now surrounded with broad and shady avenues, where, on the smooth gravel-walks, thousands of citizens find a favorite retreat, and the enjoyment of a cool breeze, on the summer evenings.

The number of elms now exceeds seven hundred; and these are, in some parts, tastefully intermingled with other kinds of trees, lining the numerous shady paths which conduct across the grounds around their circuit, or by winding courses up and down the gentle declivities.

On three sides the common is bordered by long ranges of stately mansions, being a favorite part of the city on account of its fine scenery, free air, and retirement. On the west it looks down on Charles river, there spreading out into a wide bay, from whose shores rise the swelling and cultivated slopes and hills of Roxbury, Brookline, Brighton, and Cambridge—no less celebrated from the historical associations with the siege of the city in 1775, than from the embellishments they have received in later days, by the numerous rural residences of citizens.

Overlooking the common from the summit of Beacon hill, on its northern side, stands the statehouse, an old and venerable edifice, ornamented with a Grecian colonnade, and crowned with a fine dome, which is the first object visible on approaching the city from every direction. Near it, on the west, still remains the residence of Governor John Hancock, one of the most conspicuous men of the revolutionary period. On the same side, and further west, rising from the rich foliage which surrounds the spectator in the common, conspicuous among many fine edifices, stands the mansion of the Hon. David Sears. This edifice is in a plain, massive style of architecture, but has a light and pleasing effect, being constructed of white granite, and having the front broken by two semi-circular projections, like round towers, extending from the ground to the roof, and affording to the three stories abundant light and commanding views of the beautiful and extensive scenery spread out around. In this vicinity are numerous fine dwellings, the residences of distinguished gentlemen—of the princely merchants, the Lawrences and Appletons—of the eminent lawyers, Otis, Choate, and Mason—of the historian



Residence of Hon. David Sears, Boston.

Prescott, and many others. Costly buildings may also be seen on the several streets which have, chiefly within the last twenty years, been built up parallel and at right angles with the north line of the common, on the upper slope of Beacon hill; but none surpass, in size or effect, the elegant mansion depicted and described.

Fountain Park, near Philadelphia.—This is not only one of the most remarkable situations in the country in point of picturesque beauty, but also endeared to us by historical associations of the most romantic character. Here, by the shore of the Schuylkill (or Manayone, as it was called by the aborigines), occurred some of the most desperate fights recorded in the annals of Indian warfare; here the axe of the first settler under Penn awoke the echoes of the woods. At the hour that the battle of Germantown was raging around Chew's house, here, at least three miles from that celebrated spot, the Hessians were endeavoring to crush a band of continentals, inferior in arms and discipline, but not in iron courage. After twelve bloody onsets, that poured from the hill into the valley, the continentals drove their enemies across the river at the ford, whose traces are now obliterated by the rising of the water from Fairmount dam. This ford is situated on the southern verge of Laurel hill, one of the most beautiful spots on the globe, whose spires and monuments are now visible from the mansion.

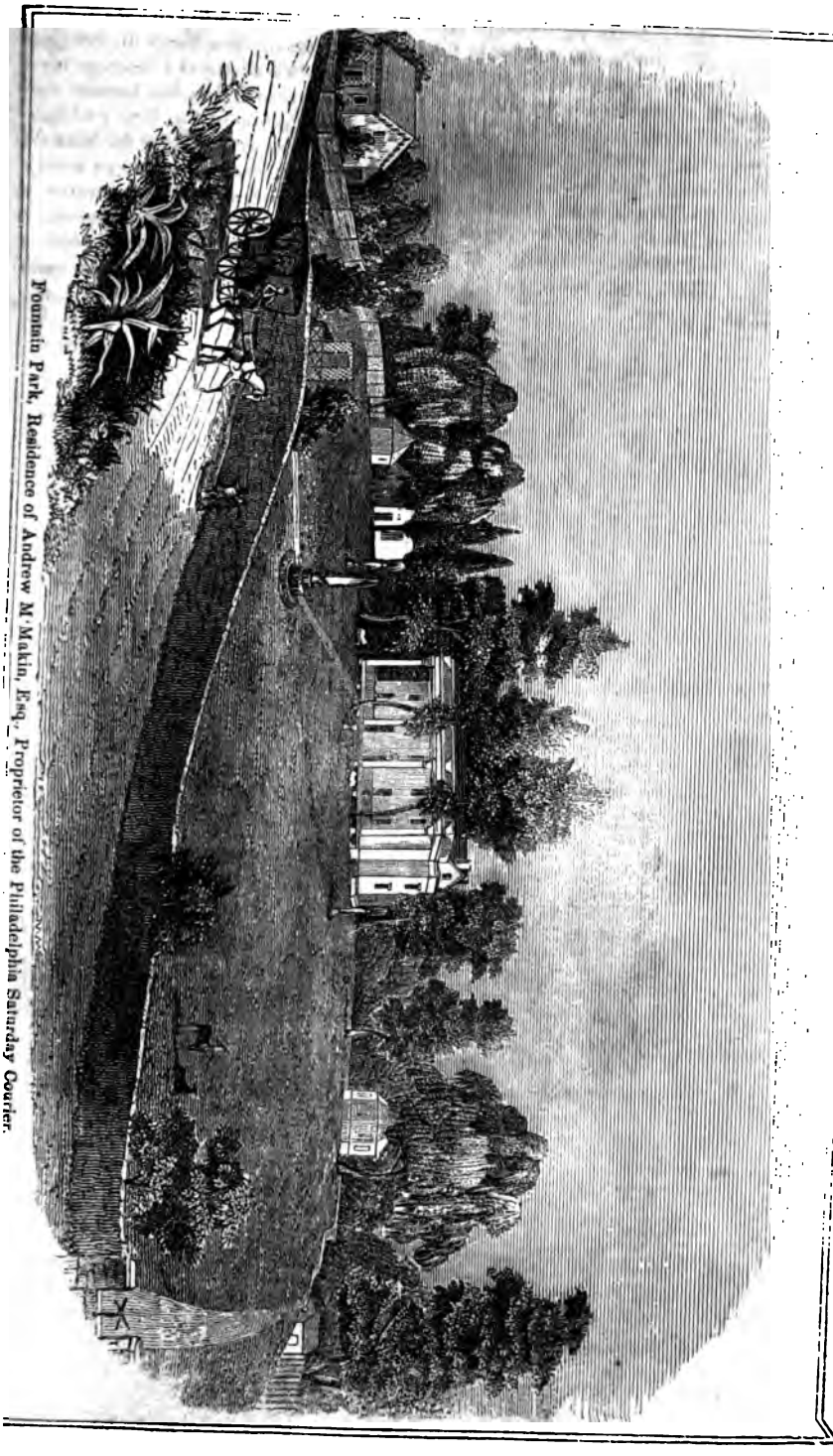
It was here that William Penn loved to wander, contemplating, either in his walks on shore, or in his excursions on the river, the rise and progress of his much-beloved colony. In those wanderings, perchance, he already saw—for he was a deep thinker—his colony rise into a state: that state one of the great nations among thirty independent commonwealths.

The time is not distinctly marked when the original fabric, reared some time in the commencement of the eighteenth century, was succeeded by the present beautiful mansion—the production of the princely taste and spirit of Pennsylvania's first governor, Thomas Mifflin. Yet it is a fact distinctly established, that some of the most important councils held by Washington during the Revolution took place on this spot. The grass, spreading greenly before the porch, has been pressed by the feet of a Franklin, a Volney, a Priestley, a Jefferson, an Adams, engaged in careless converse, or philosophical discussions.

The embassadors of kings have here met the republican fathers of America. The mind wanders back, through the arcades of time, and beholds the rich display of contrasts which were exhibited in the olden time—the handsome apparel of counts, dukes, nay, princes, contrasted with the plain uniform of Morgan the rifleman, or the modest costume of Jefferson, the author of the Declaration of Independence.

When Washington was president, he was wont to leave his country residence, in Germantown, and stroll by the lake northward of the mansion, his imposing form reflected in its waves; or, seated on the porch, he would gaze on the Schuylkill, thinking over again the trials and battles of his life, from Braddock's defeat to the fall of Yorktown.

These are remarkable associations. Among other memories, we must not forget that the singular round or sexagonal tower, that rises a hundred yards to the east of the mansion, was once the hermitage of religion and the closet of eloquence. The celebrated clergyman, Dr. Smith, who preached those stirring and remarkable sermons during the war, built this tower, filled it with his books, and here elaborated his most finished productions. The doctor was a Scot by birth, but an American in feeling. His grandson, Richard Penn Smith, now resides on the ground, and inherits in a great degree the genius of his ancestor.

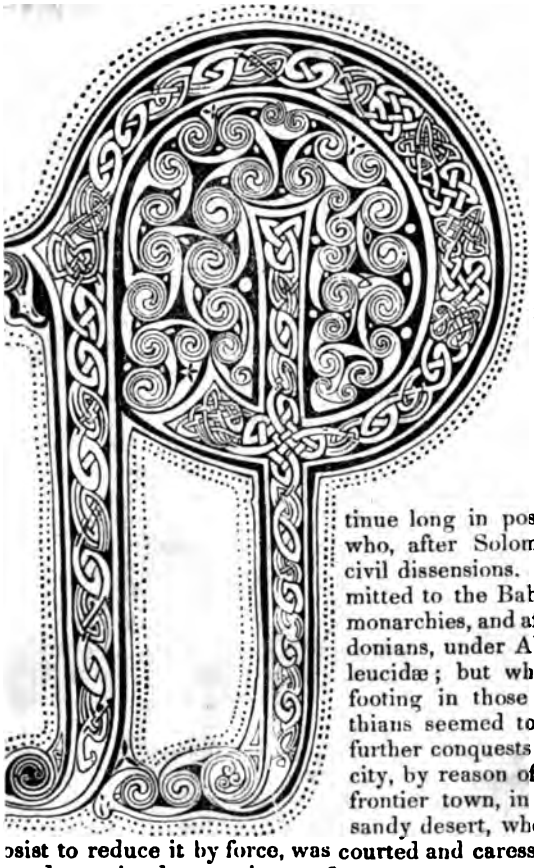


Fountain Park, Residence of Andrew M'Makin, Esq., Proprietor of the Philadelphia Saturday Courier.

Perhaps not the least interesting reflection of all is presented in the fact that the old mansion, once hallowed by the presence of Washington, La Fayette, and Wayne—enlivened by the visits of noblemen of royal blood, is now the domain of a gentleman whose only heraldry is recorded in his honest rise to fortune and fame, from the walks of toiling life into one of the first publishers and literateurs of the country. We need not refer to ANDREW M'MAKIN, Esq., proprietor of the "Courier," whose delightful family are always ready to extend the old-fashioned rites of hospitality to the stranger, and render a visit to Fountain Park (or Aromana, as the Indians called it and its lakes) a journey of homeborn pleasure. It is rarely that literary labor meets with a repose like this—much more rarely are its honors worn so well, or with such unpretending grace.

SUBJECT XIV.

RUINS.



ALMYRA.—All Syria, and perhaps the whole world, does not afford a view of more magnificent ruins than those of Palmyra, which evidently demonstrate its ancient prosperity and grandeur.

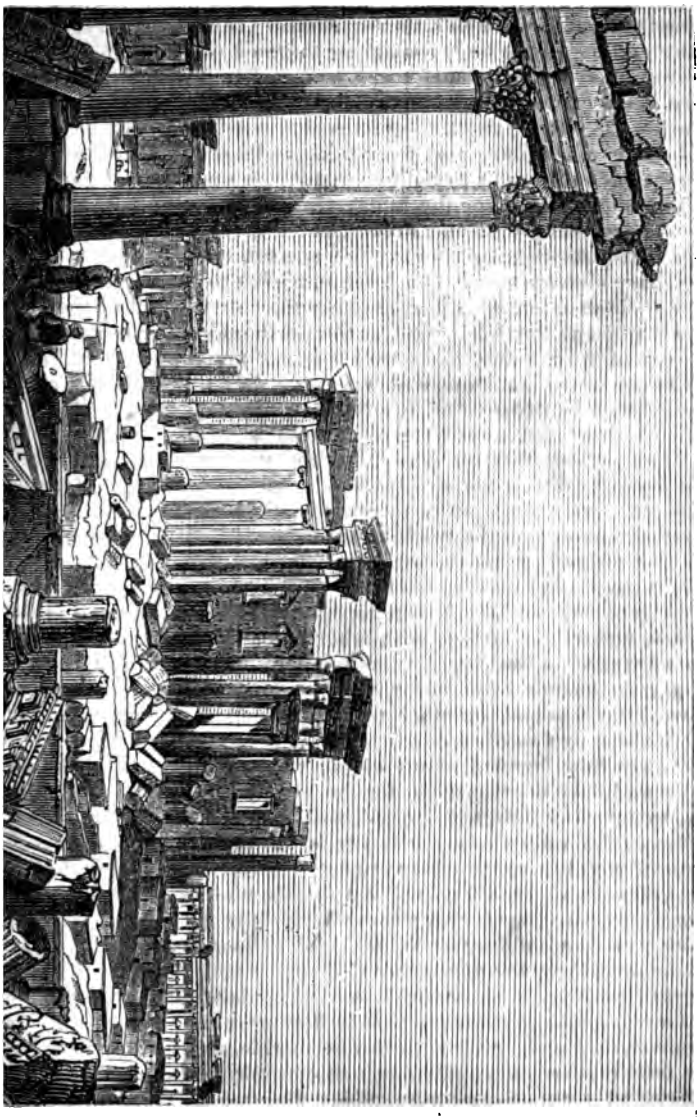
This vast city was founded by Solomon, in the desert of Syria, but it may be supposed that so advanced a garrison as this, being over three hundred miles from Jerusalem, did not continue long in possession of the Jews, who, after Solomon's death, fell into civil dissensions. It undoubtedly submitted to the Babylonian and Persian monarchies, and afterward to the Macedonians, under Alexander and the Seleucidæ; but when the Romans got footing in those parts, and the Parthians seemed to put a stop to their further conquests in the east, then this city, by reason of its situation, being a frontier town, in the middle of a vast sandy desert, where armies could not osist to reduce it by force, was courted and caressed by the contending and permitted to continue a free state, a mart or staple of trade for venience of both empires, as plainly appears from Appian and Pliny. these advantages of freedom, neutrality, and trade, for nearly two es, Palmyra grew wealthy and magnificent, and it was afterward much l and enriched by the emperor Adrian, to whom it submitted about r of Christ 130. From the time of Adrian to that of Aurelian, for ndred and forty years, this city continued to increase in power and till Zenobia, the wife of Odenatus, and queen of Palmyra, as she is ly called, having some dispute with Aurelian, after her husband's about a share in the empire, he marched against her, and having in

two battles routed her forces, he shut her up and besieged her in Palmyra. The city was soon obliged to surrender, and Zenobia, flying with her son, was pursued and taken; with which Aurelian being satisfied, he spared the city, and leaving a small garrison in it, marched to Rome with this captive lady; but the inhabitants, being willing to shake off the Roman yoke, cut off the whole garrison, which Aurelian understanding, though he was got into Europe, returned speedily with his army, took the city again without much opposition, put the people to the sword with uncommon cruelty, and delivered it to be pillaged by his soldiers. This calamity befell Palmyra about the year of our Lord 272; and though Aurelian did not then burn or destroy the buildings, yet the damage it sustained was never retrieved, so as to make any considerable figure ever after. In what age, or from what hand it received its final overthrow, which reduced it to its present miserable condition, we can not gather from history; but it was probably burnt and desolated in the obscure ages of the world, during the wars of the Saracens.

These ruins lie in the desert of Syria, about one hundred and fifty miles southeast of Aleppo, and have been visited by several scientific men, who have carefully examined and described them. By the space they take up, the city appears to have been of vast extent; but there are no vestiges of any walls remaining, nor is it possible to judge of the ancient form of the place. The present inhabitants are about thirty or forty poor families, who live in little huts made of earth, within the walls of a spacious court, which formerly enclosed a most magnificent heathen temple dedicated to the sun. This court is a square of two hundred and twenty yards each side, encompassed with a high and stately wall, adorned with pilasters both within and without, to the number of sixty-two on a side: and had not the Turks, out of a vain superstition, purposely beat down the beautiful cornices, perhaps the world could not boast of more exquisite carvings, as one may judge from some remaining fragments. The west side, on which is the entrance, is mostly broken down, and near the middle of the square another higher wall is raised out of the ruins, which appears to have been part of a castle, probably built by the Mamelukes, for the security of the place. Before the whole length of this new front, except a narrow passage left for an entry, there is cut a deep ditch, faced with stone to the foot of the wall, which must have made it difficult to be assailed. This wall entirely shrouds the magnificent entry that belonged to the first fabric, of the stateliness whereof we may form some idea from the two stones that support the sides of the great gate, each of which is thirty-five feet high, both standing, and beautifully covered with vines and clusters of grapes, exceedingly bold and natural.

As soon as we enter within the court, we see the remains of two rows of very noble marble pillars, thirty-seven feet high, with capitals of admirable workmanship. About fifty of these only remain entire; but there must have been many more, for they appear to have run quite round the whole court, and to have supported a very spacious double piazza, or cloister. The walk on the west side of this piazza, which is opposite to the front of the temple, seems to have exceeded the rest in breadth and beauty; and at each end are two niches for statues at their full length, with their pedestals, borders, supporters, and canopies, all carved with the greatest art and curiosity.

In the middle of this once-beautiful enclosure, but now filled with the dirty huts of the inhabitants, stood the temple of the sun, encompassed with another row of pillars of a different order, and much taller than the former, being about fifty feet high, of which only sixteen are now remaining. The space included within these pillars was fifty-nine yards in length and about twenty-eight in breadth; and the temple was thirty-three yards long and fourteen or



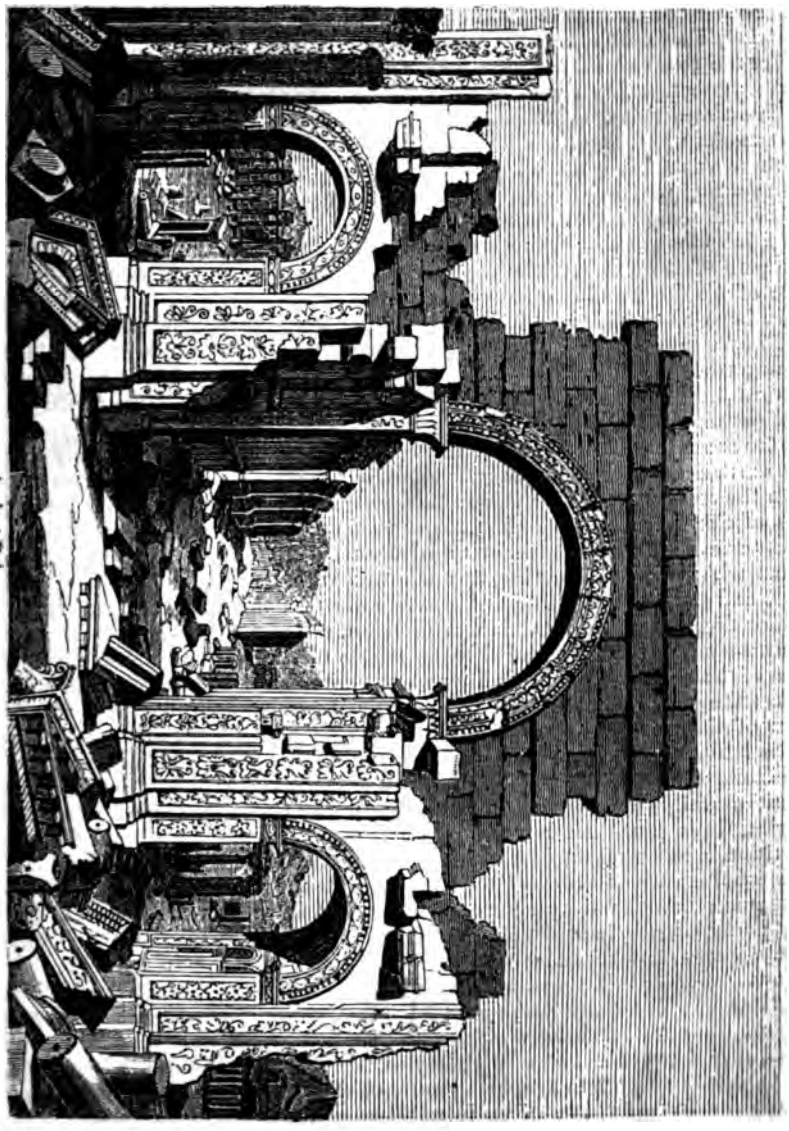
fifteen broad, pointing north and south, with a magnificent entry on the west, exactly in the middle of the structure. The outward walls of this temple are still standing, in which it is observable that the windows are narrower at the top than the bottom, and not very large, but all adorned with excellent sculptures. Just over the door any one may discern part of the wings of a large spread eagle, extending its whole width, which made Mr. Halifax at first imagine it might have been rather a cherub overshadowing the entrance, there being nothing of the body remaining to guide one's judgment: but afterward, seeing other eagles on stones that were fallen down, he concluded this must have been one likewise, only of a much larger size. Never were vines, bunches of grapes, and the other sculptures in general, executed in so bold and lively a manner; and everything to be seen about the small remains of this temple induces us to believe that it was once a most glorious structure.

The Turks, or rather the Mamelukes, have built a roof to these walls, supported by small pillars and arches, but a great deal lower, and in other respects disproportionate to what the ancient covering must have been; and they have converted it into a mosque, adding to the south end new ornaments after their manner, with inscriptions and sentences out of the Koran, written in wreaths and flourishes; but at the north end of the building, which makes no part of the mosque, there are remains of much greater art and beauty, viz., the most curious fretwork and carvings. In the middle of the roof is a dome or cupola, about two yards in diameter, made of some artificial composition, which is, however, an admirable piece of workmanship.

After viewing this temple, our author went to another situation, where he had a prospect of such stately ruins, that if one may frame an idea of the original beauty of Palmyra by what is still remaining, it may be questioned whether any city in the world could have vied with it in magnificence. Advancing toward the north, we have before us a fine obelisk, about fifty feet in height, consisting of seven large stones, besides its capital and the wreathed work about it. Its circumference just above the pedestal is four yards six inches, and its sculptures, as in other places, are extremely beautiful; but it has no statue on the top of it, as probably it had formerly. About a quarter of a mile distant from this two other large pillars are to be seen, the one toward the east and the other toward the west, which would incline one to think there was a continued row of them.

Proceeding forward about eighty yards from the obelisk, we come to a large and lofty entry, which, for the beauty of the workmanship, is not inferior to anything before described, and leads into a noble piazza or portico, above half a mile in length and forty yards in breadth, enclosed within two rows of stately marble pillars, twenty-six feet in height and eight or nine in circumference. One hundred and twenty-nine of these are standing and entire, but, upon a moderate computation, there could not have been less originally than five hundred and sixty. This spacious piazza was terminated by a row of pillars, standing somewhat closer than those on the sides; and perhaps there might have been a sort of banqueting-house above, or else a stately building, whose ruins lie at a little distance to the left, might have been allotted to that use, being built of fine marble, and having an air of delicacy in the workmanship beyond what is discernible in the piazza. The pillars that supported it are of one entire stone: and one of them, that was fallen down without breaking, measured twenty-two feet in length and eight feet nine inches in circumference.

On the west side of the great piazza are several gates leading into the court of the palace, two of which, when in their perfection, must have been exceedingly magnificent and beautiful, not only for the elegance of the work



Arch at Palmyra

in general, but in particular for the noble porphyry pillars with which they were adorned, each gate having four in its front, two on one hand and two on the other. There is only one of these now standing in its place, though there is another entire; they are about thirty feet high and nine in compass, and so exceedingly hard that a piece can not be broken off without great difficulty. The palace itself is so entirely ruined, that no judgment can be formed of what it was when standing, either as to its figure or workmanship; but it was certainly answerable to the splendor of the city.

On the east side of the long piazza stand a vast number of marble pillars, some perfect, and others deprived of their beautiful capitals, but so scattered and confused that it is not possible to reduce them to any order, so as to conjecture for what purpose they originally served. In one place we find several of them arranged in a square, paved at the bottom with broad flat stones, but without any roof or covering; and at a little distance thence are the remains of a small temple, which seems to have been of curious workmanship, but the roof is quite gone, and the walls are much defaced and consumed. Before the gate of it there remains a piazza, supported by six pillars, two on each side of the door, and one at each end; and the pedestals of those in the front have been filled with inscriptions, which are now defaced and illegible.

The sepulchres of Palmyra are worth the attention of the curious, being square towers four or five stories high, standing on each side of a hollow way, toward the north part of the city. They extend in length the space of a mile, and perhaps anciently they might extend a great way further. They are all of the same form, but different in magnitude and splendor, according to the circumstances of their founders. Two of these sepulchres are more entire than the rest, though not without marks of Turkish fury, as well as the injuries of time. They are rather larger than our common church-steeples, and five stories high, the outside being of ordinary stone, but the partitions and floors within of good marble, and adorned with lively sculptures and paintings, and the busts of men and women, most of them defaced and broken. Under these busts, or on the sides of them, are some inscriptions in an unknown character, being probably the names of the persons there deposited. One of these sepulchres has a door on the south side, whence there is a walk across the middle of the building, and the floor being broken up, affords a view of the vaults below. The spaces on each hand are divided by thick walls into six partitions, each capable of receiving the largest corpse; and if piled one upon another, as their method seems to have been, each of these partitions might contain six or seven bodies. In the lowest, second, and third stories, these partitions are uniform, except that from the second floor one partition is reserved for a staircase. In the upper floors, the building being somewhat contracted toward the top, there is not room for a continuation of the same method, and therefore the two highest stories are not so divided, nor perhaps ever had any bodies laid in them, unless that of the founder, whose statue, in a recumbent posture, is placed in a niche, in the front of the monument, so as to be seen within and without, and near this statue is a Greek inscription. The other monument is similar, only the entrance and front are toward the north, and the paintings are not so fine; but the carvings are as good, and the whole looks as stately as the former. Besides, it has the advantage with respect to age, being not so old as the other by a hundred years, as appears from the date of an inscription over a niche in the front.

From these sumptuous mausolea, and other magnificent structures, it is reasonable to conclude that the Palmyrenes were a potent and opulent people before they became subject to the Romans, and that they were not altogether indebted to them for their greatness.

Balbec.—Next to the ruins of Palmyra, there are none which more attract e attention of travellers than those of Balbec, a town about thirty miles north ' Damascus, supposed to be the ancient Heliopolis, so called from an image ' the sun, which was worshipped by its pagan inhabitants. When Wood as there, in 1751, the place contained about five thousand inhabitants, among hom were a few Jews and Christians; but later accounts describe its popu- tion as greatly reduced. The present town (now containing about a thou- ınd half-savage Arabs), which was destroyed by an earthquake in Novem- ɜr, 1759, was of a square form, about a mile in compass, surrounded by a all of considerable strength, which had been built out of the ruins of the ıcient city; but the houses were very mean, such as are usually met with in ırkish villages. On the southwest side of the town were the noble remains ' a heathen temple, with some other magnificent buildings; but in later times ıese old structures have been patched and pieced, some additions made to ıem, and the whole converted into a castle. The additional buildings were ı no mean taste, but yet the modern architecture was easily distinguished om the ancient.

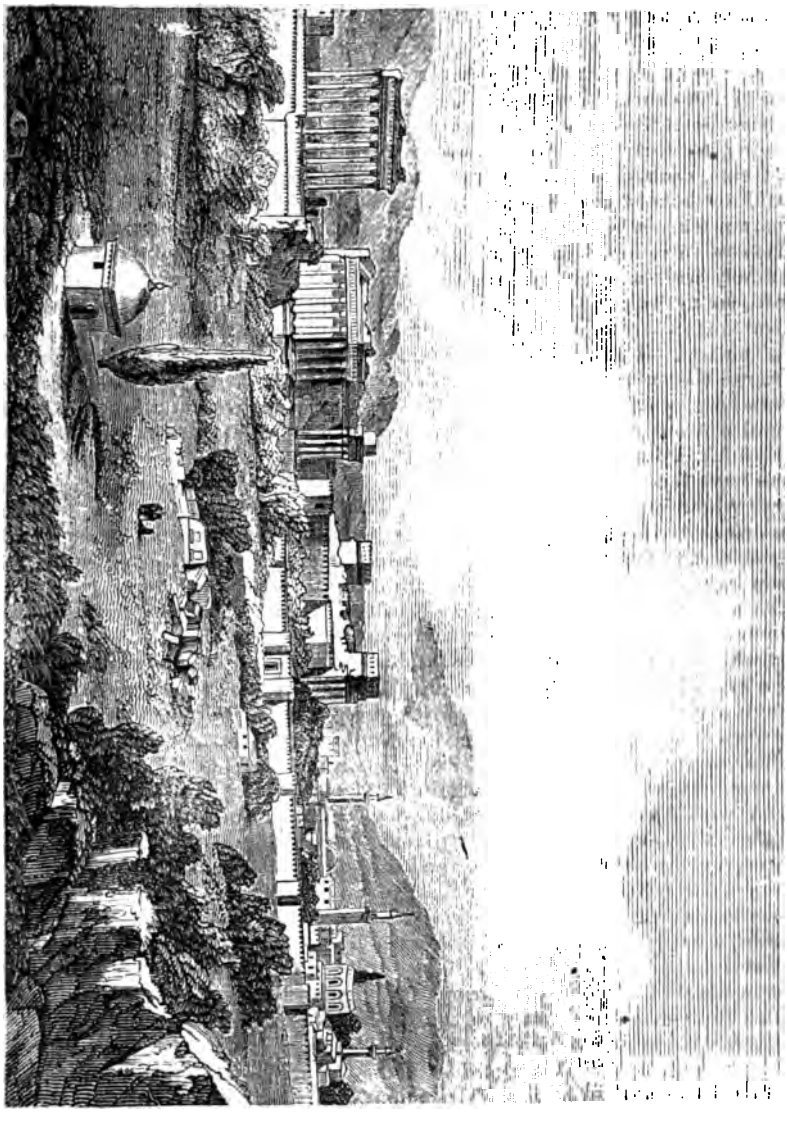
The first thing observable among those venerable remains of antiquity, as ıey stood before the earthquake, was a rotunda, or round structure, encom- ıssed with beautiful pillars of the Corinthian order, which supported an ele- ınt cornice. Though round on the outside, it was octagonal within, having ght arches supported by eight Corinthian columns, each of one single piece. was mostly of marble, and was of late open at the top, but appeared to ıve been covered with a shell, and to have been embellished with some fig- ıes of eagles. In a word, the whole was very elegant and stately; but the reeks, who ventured to use it as a church, though it was in a tottering con- tion, had spoiled the beauty of the inside by daubing it with plaster.

Beyond the rotunda was a large and lofty pile of buildings, composed of ıst square stones, and leading into a stately piazza or portico, one hundred ıd fifty paces in length, which opened to the temple before mentioned. The ımple had surprisingly withstood the injuries of time, and escaped the fury f superstition, the body of it being almost entire. It was an oblong square, nd as to its form and proportion it very much resembled the church of St. 'aul, Covent garden, at London, but in dimensions and other respects the albec temple was very superior. Its length, measured on the outside, was ne hundred and ninety-two feet, and its breadth ninety-six: within, it was ne hundred and twenty feet long and sixty broad. The pronaos, or anti- ımple, had long tumbled down, the pillars that supported it being broken. 'he body of the temple was surrounded by a noble portico, sustained by pil- ırs of the Corinthian order, each of which consisted of three stones, being bout fifty feet high and more than six in diameter. These pillars were ıree yards distant from each other, and as much from the wall of the tem- le, fourteen of them being on each side, and eight at the end, reckoning the ırner pillars twice over. They had a stately architrave running round their apitals, with a cornice admirably carved. The covering of the portico con- sted of large hollow stones, which formed an arch, extending from the pil- ırs to the wall of the temple; and in the centre of each stone was the figure f a deity or hero, but most of them so defaced as not to be easily distin- uished. There was a Mercury, indeed, that had received but little injury, nd an eagle flying away with Ganymede, both carved with all the life im- ginable. A continued bas-relief, in miniature, ran round the foot of the wall f the temple, on a marble border, representing various ceremonies of the eathen worship, in which there was a surprising mixture of figures, both of ıen and beasts, but without the least confusion.

Nothing could be more grand than the entrance into this magnificent edifice, the ascent being by thirty steps, bounded on each side by a wall, which terminated in a pedestal, whereon was formerly placed a statue. Eight Corinthian pillars, with a large triangular pediment, composed the front, and within these pillars, at about two yards' distance, were four others: and also two pillars of three faces each, which all together formed a portico before the door of the temple, twenty-four feet in depth and upward of sixty in breadth. The door of the temple appeared to the utmost advantage through these pillars—their nice proportions, their distance from each other, and the recess of the door itself, all contributing to make it look majestic. The doorcase or portal was about forty feet high and twenty-eight wide; and, as to construction and proportion, resembled the great portal at the west end of St. Paul's cathedral at London, but far excelled it in the richness of its sculptures. The bas-relief overhead was an admirable piece of sculpture, and though much injured, still discovered inimitable beauties. It was a large eagle with his wings expanded, carrying a *Caduceus* (Mercury's rod or wand entwisted with two serpents) in his talons, and holding in his beak the strings or ribands coming from the ends of two festoons, the other ends being supported by two flying fames—the whole done in the most exquisite manner.

The inside of this temple was divided into three aisles somewhat like our churches, the broadest being in the middle. These were formed by two rows of fluted Corinthian columns, above three feet in diameter. Each row consisted of six columns, which stood about eighteen feet distant from each other, and twelve from the walls of the temple. All round the walls were two rows of pilasters, one above another, and between the pilasters were tall niches that seemed to have been designed for images. Of those pilasters there were eight in a row on each side, and nine niches, the bottom of which were upon a level with the bases of the pilasters, and the wall to that height was wrought like a Corinthian pedestal, the same order having been exactly observed in the niches themselves. Near the west end of the middle aisle there was an ascent of twelve marble steps to a part of the temple distinguished from the rest by two large square columns adorned with pilasters, forming a noble entrance corresponding to that of the temple itself. This part, for want of a proper name, was called the choir; and it is supposed here was formerly a partition, and that the two pillars supported a canopy. There was a large marble niche at the bottom of this choir, which was undoubtedly the place of the principal idol anciently worshipped in this temple. All round this part of the structure there was a vast profusion of excellent sculpture: on one hand, fruits, flowers, festoons, birds, and the like; on the other, Neptune, Tritons, fishes, and other marine figures. The roof of the temple was very bold, and adorned with beautiful carvings. In short, the fabric, as it lately appeared, struck a spectator with astonishmont, and gave the most just ideas of the magnificence of the ancient architecture.

An old wall, which encompassed the stately remains we have been describing, was built of stones of such a prodigious size, that those of the famous Stonehenge in England are not to be compared with them; and the whole was so surprising and difficult to be accounted for, that the natives of Balbec, as is usual with the vulgar in such cases, believed it to be the work f the devil. Three of the largest of these stones, lying end to end in the wall, are one hundred and eighty-three feet long, one of them being sixty-three feet long and the others sixty-two a-piece. They are twelve feet deep, and their breadth the same; and what is more astonishing, they were raised up into the wall above twenty feet from the ground. These are the largest that travellers have noticed, but the other stones of this wall are of a prodigious size.



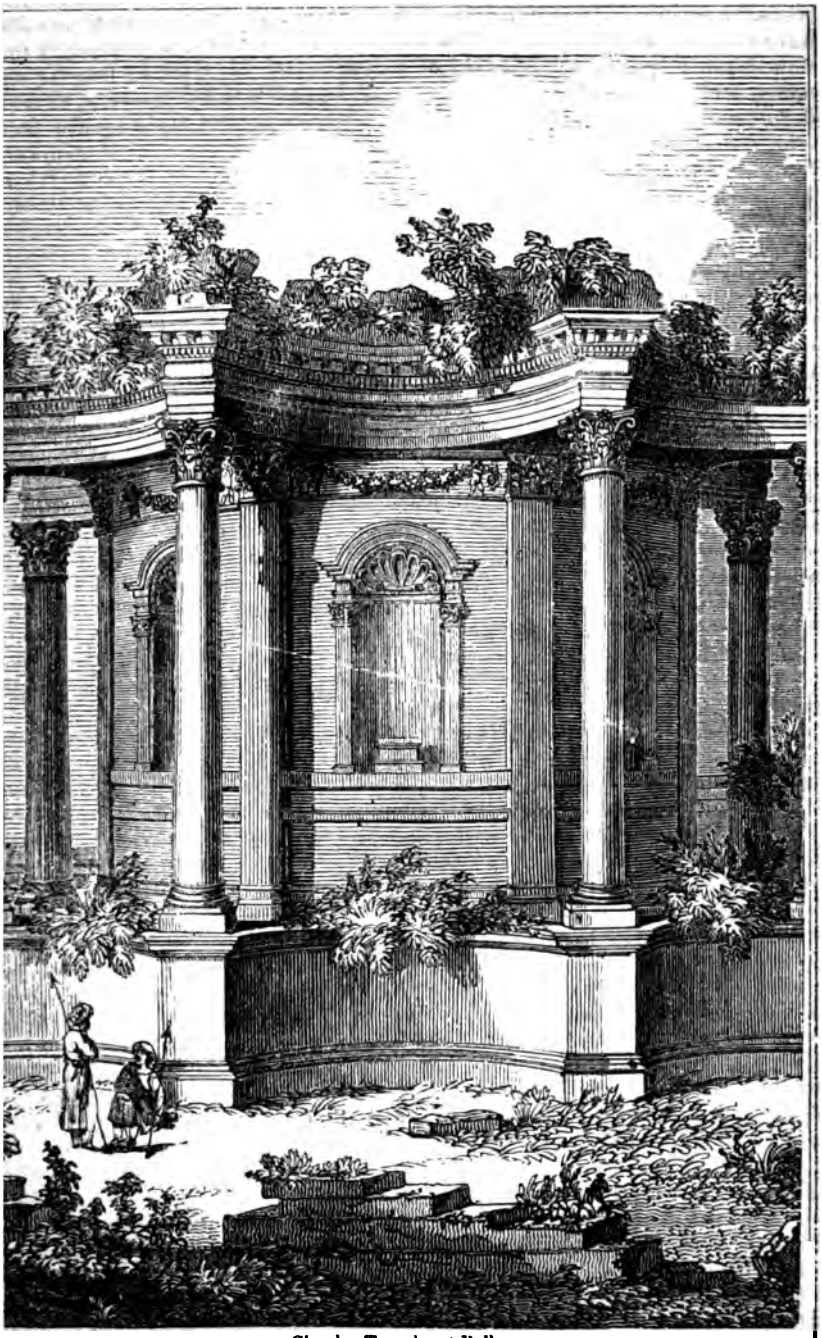
Ruins of the City of Balbec.

Within this enclosure, at a small distance from the temple above described, were the ruins of a stately palace, as it is supposed to be, of which travellers have taken very little notice. Going through the arched portico already mentioned, the first striking object was a spacious hexagonal building or wall, which forms a kind of theatre, being open at one end, with a terrace, to which there was an ascent by steps of marble. This opened into a square court, larger than the former, and encompassed with more magnificent structures. On each hand there was a double row of pillars, which formed porticoes, above one hundred and thirty yards long and sixteen broad; and at the bottom of the court there was a large and sumptuous structure, which seemed to have been the body of the palace, as one may judge by the columns belonging to this part, nine whereof were lately standing, which were of a vast size, each consisting of one stone, and of the Corinthian order. We could not behold the remaining vestiges of this palace without admiration, wherein we saw a vast variety of ornaments, without any of the extravagant mixtures introduced in later ages. Here were busts and statues without number, well-wrought niches, trophies, bas-reliefs, incrustations; and, in a word, so many valuable remnants of ancient architecture and sculpture, as show that the taste of Greece and the magnificence of Rome were united in this palace. The great vaults underneath it were no less surprising, for through the ruins one may discern long flights of marble stairs, some of them containing nearly two hundred. The bold turn and elevation of these vaults are also wonderful; and the walls have been adorned with bas-reliefs and inscriptions in Roman characters, but the dampness of the place and length of time have rendered them illegible. Some of the vaults receive light from large windows, that are level with the surface of the ground above; but others are quite dark, and can not be viewed without torches or candles, either because of their great depth, or because the passages, originally made to give them light, are now filled up with rubbish.

At a short distance from the walls of the city is a quarry of freestone, from which the immense stones employed in the body of the great temple were probably taken, while the ornamental parts of those buildings were supplied by a quarry of coarse white marble, at a great distance to the west of the city. There are still remaining in the first quarry some vast stones cut and shaped for use. One of them thus shaped, but not entirely detached from the quarry at the bottom, is seventy feet long, fourteen broad, and fourteen feet five inches deep, whence it must contain 14,128 cubic feet: and were it Portland-stone, would weigh about 2,270,000 pounds avoirdupois, or about 1,135 tons.

The inhabitants of this country confidently maintain that both Balbec and Palmyra were built by Solomon; and it is probable that his character, as a wise and yet voluptuous prince, may have given rise to an opinion which, with respect to Balbec, seems to have scarcely any other foundation: for nowhere could an eastern monarch enjoy a more luxurious retirement than amid the streams and shades of Balbec. The natives relate many stories of the manner in which he spent his hours of dalliance in this retreat—a subject on which the warm imagination of the Arabs is apt to be too particular.

Petra is the capital of Edom or Seir, the Idumea or Arabia Petrea of the Greeks, the Nabatea, considered both by geographers, historians, and poets, as the source of all the precious commodities of the east. And as Idumea is derived from Edom, or Esau the son of Isaac, so is Nabatea deduced from Nebaioth the son of Ishmael. The traditions of the Arabians refer to Ishmael, the son of Abraham, as the father of the families that settled in Hejaz, which is Arabia Deserta; and to Edom as the ancestor of the Idumeans, who occupied Arabia Petrea. The name of this capital (Petra)



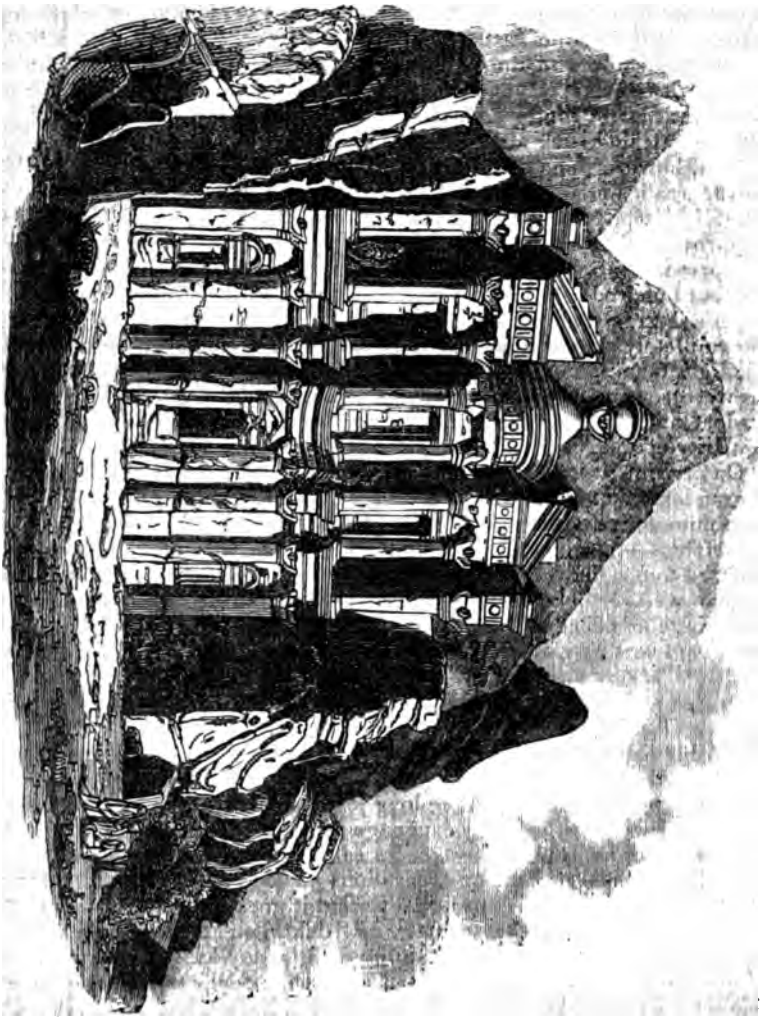
Circular Temple, at Balbec.

in all the various languages in which it occurs, implies a rock; and as such it is described in the Scriptures, in Strabo, and Al Edrissi; but it is a rock supplied with an abundant spring of water, styled Thomud by the Nubian, which gives it a distinction from all the rocks in the vicinity, and constitutes it a fortress of importance in the desert. Strabo did not visit it himself, but describes it from the account of his friend Athenodorus, the philosopher. Athenodorus spoke with great admiration of the people, their civilized manners and quiet disposition. Moses was forbidden to molest the sons of Edom in his passage through the wilderness; but that there was then a considerable commerce in the country, we have reason to conclude, from the conquest of Midian, in its neighborhood, by Gideon, not many years later, when gold is described as abundant among the Midianites, and their wealth in camels a proof of the traffic by which they subsisted. In the reign of David, Hadad the prince of Edom was driven out, and Hebrew garrisons were placed in Elath and Ezion-Geber, where Prideaux supposes that David commenced the trade of Ophir, which was afterward carried to its height by Solomon."

The whole commerce of the east originally passed through Arabia Petrea to Phenicia, Tyre, and Egypt. Notwithstanding that the caravans decreased in proportion to the advance of navigation, still Petra was a capital of consideration, at the time that Egypt became a province of the Roman empire: there was still a proportion of the trade passed from Leukè Komè (the white village) to this city, and its prince maintained a rank similar to that of Herod in Judea. In all the subsequent fluctuations of power, some commercial transactions are discoverable in this province; and if Egypt should ever be under a civilized government again, Petrea would be no longer a desert.

The country of the Nabataei, of which Petra was the chief town, is well characterized by Diodorus as containing some fruitful spots, but as being, for the most part, desert and waterless. With equal accuracy, the combined information of Eratosthenes, Strabo, and Pliny, describes Petra as falling in a line drawn from the head of the Arabian gulf (Suez) to Babylon; as being at the distance of three or four days from Jericho, and of four or five from Phœnicon, which was a place now called Moyeleh, on the Nabatæan coast, near the entrance of the Ælanitic gulf; and as situated in a valley of about two miles in length, surrounded with deserts, enclosed within precipices, and watered by a river. The latitude of thirty degrees, twenty minutes, ascribed by Ptolemy to Petra, agrees moreover very accurately with that which is the result of the geographical information of Burckhardt. The vestiges of opulence, and the apparent date of the architecture at Wady Mousa, are equally conformable with the remains of the history of Petra found in Strabo, from whom it appears that, previous to the reign of Augustus, or under the latter Ptolemies, a very large portion of the commerce of Arabia and India passed through Petra to the Mediterranean, and that *armies* of camels were required to convey the merchandise from Leukè Komè on the Red sea, through Petra to Rhinocolura, now El Arish. But among the ancient authorities regarding Petra, none are more curious than those of Josephus, Eusebius, and Jerome, all persons well acquainted with these countries, and who agree in proving that the sepulchre of Aaron in Mount Hor was near Petra. Hence it seems evident that the present object of Mussulman devotion, under the name of the tomb of Haroun, stands upon the same spot which has always been regarded as the burying-place of Aaron; and there remains little doubt, therefore, that the mountain to the west of Petra, is the Mount Hor of the Scriptures, Mousa being, perhaps, an Arabic corruption of Movra, where Aaron is said to have died.

Captains Irby and Mangles, who, in 1818, visited Petra with considerable



Tomb at Petra.

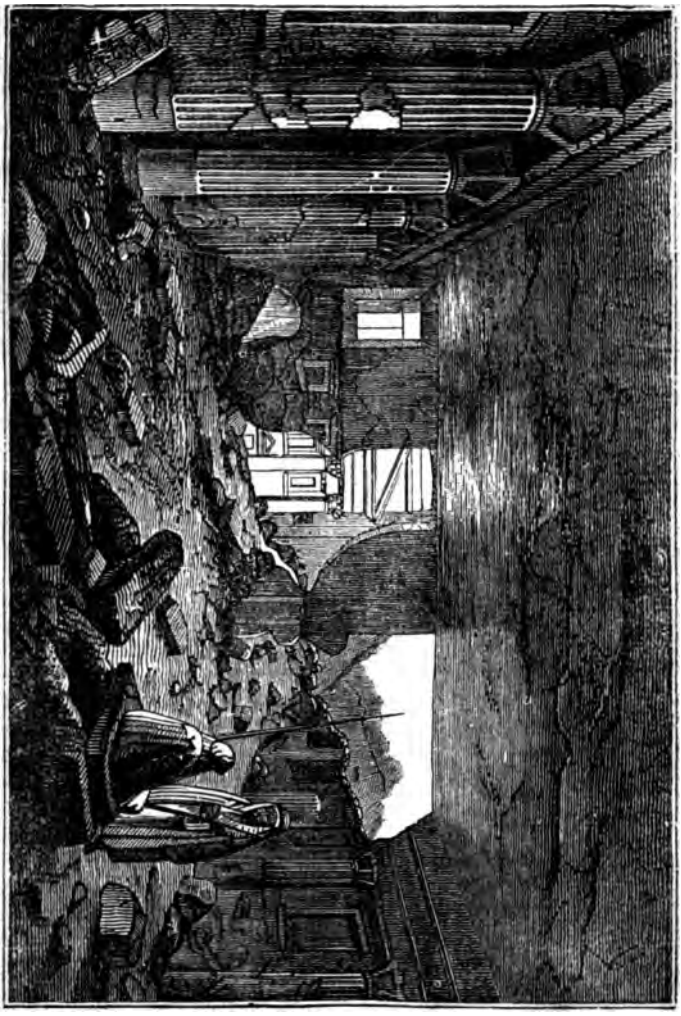
risk, and only after persevering in the face of numerous obstacles, say, in their account:—

"Our defile brought us directly down into this place [the valley of Wady Mousa], whose name had become so familiar to us: it is, at the point where we entered it, a stony but cultivated valley, of moderate size, without much character or beauty, running from east to west. A lesser hollow, sloping down to it from the southward, meets it at an angle: at the upper end of the latter valley is the village seen over stages of hanging fruit-grounds, which are watered by a spring. * * Some hundred yards below this spring begin the outskirts of the vast necropolis of Petra. * * As we advanced, the natural features of the defile grew more and more imposing at every step, and the excavations and sculpture more frequent on both sides, till it presented at last a continued street of tombs, beyond which the rocks, gradually approaching each other, seemed all at once to close without any outlet. There is, however, one frightful chasm for the passage of the stream, which furnishes, as it did anciently, the only avenue to Petra on this side [the eastern]. It is impossible to conceive anything more awful or sublime than such an approach; the width is not more than just sufficient for the passage of two horsemen abreast—the sides are in all parts perpendicular, varying from four hundred to seven hundred feet in height—and they often overhang to such a degree, that, without their absolutely meeting, the sky is intercepted and completely shut out for one hundred yards together, and there is little more light than in a cavern. The screaming of the eagles, hawks, and owls, who were soaring above our heads in considerable numbers, seemingly annoyed at any one approaching their lonely habitation, added much to the singularity of the scene.

"On arriving at the theatre, the ruins of the city burst on the view in their full grandeur, shut in, on the opposite side, by barren, craggy precipices, from which numerous ravines and valleys, like those we had passed, branch out in all directions—the sides of the mountains, covered with an endless variety of excavated tombs and private dwellings, presented altogether the most singular scene we ever beheld—and we must despair to give the reader an idea of the singular effect of rocks, tinted with most extraordinary hues, whose summits present us with nature in her most savage and romantic form, while their bases are worked out in all the symmetry and regularity of art, with colonnades and pediments, and ranges of corridors adhering to the perpendicular surface."

A distinguished American traveller who visited this highly interesting spot recently, remarks:—

"Petra, the excavated city, the long lost capital of Edom, in the Scriptures and profane writings, in every language in which its name occurs, signifies a rock; and, through the shadows of its early history, we learn that its inhabitants lived in natural clefts or excavations made in the solid rock. Desolate as it now is, we have reason to believe that it goes back to the time of Esau, 'the father of Edom;' that princes and dukes, eight successive kings, and again a long line of dukes, dwelt there before any king 'reigned over Israel;' and we recognise it from the earliest ages, as the central point to which came the caravans from the interior of Arabia, Persia, and India, laden with all the precious commodities of the east, and from which these commodities were distributed through Egypt, Palestine, and Syria, and all the countries bordering on the Mediterranean, even Tyre and Sidon deriving their purple and dies from Petra. Eight hundred years before Christ, Amaziah, the king of Judea, 'slew of Edom in the valley of Salt ten thousand, and took Selah (the Hebrew name of Petra) by war.' Three hundred years after the last



Interior of a Tomb at Petra.

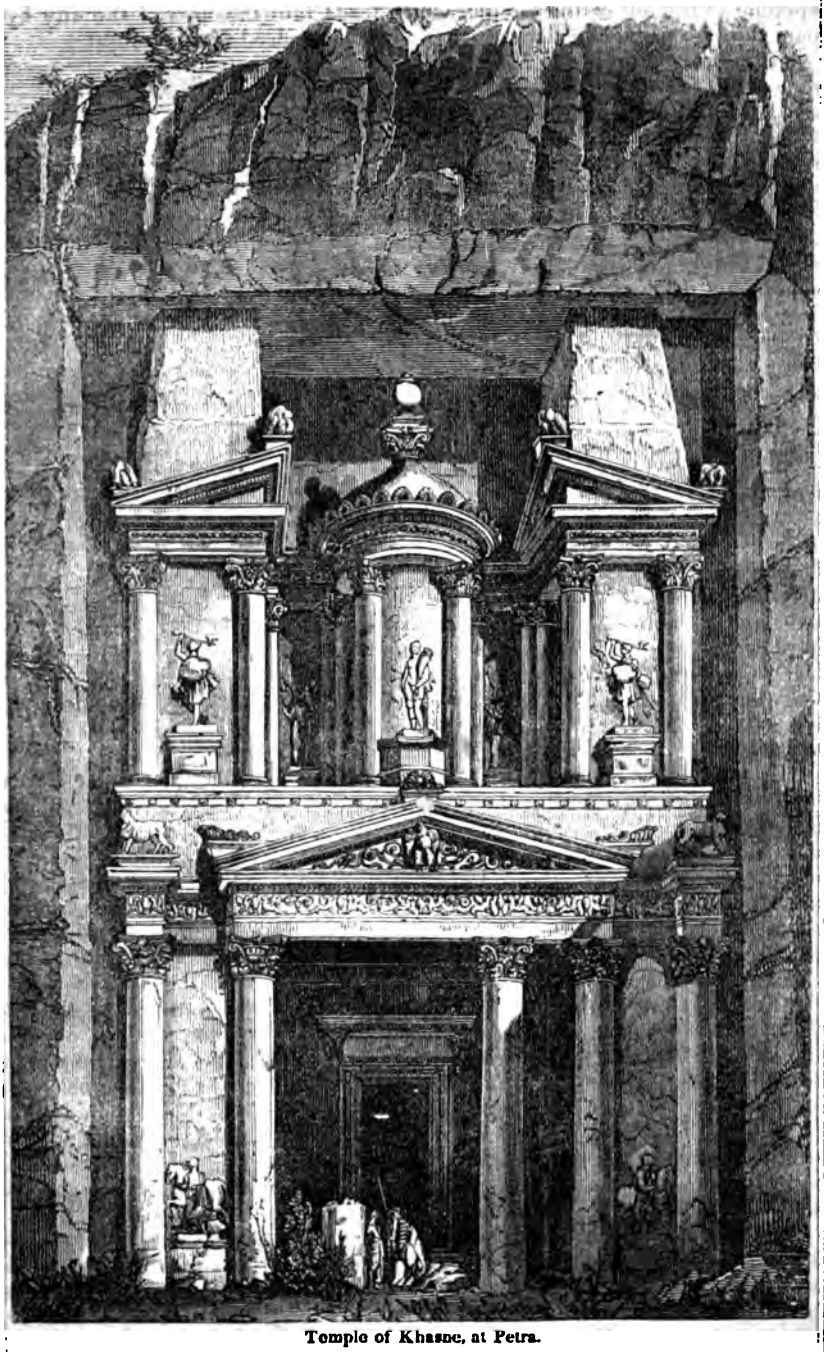
of the prophets, and nearly a century before the Christian era, the 'king of Arabia' issued from his palace at Petra, at the head of fifty thousand men, entered Jerusalem, and uniting with the Jews, pressed the siege of the temple, which was only raised by the advance of the Romans; and in the beginning of the second century, though its independence was lost, Petra was still the capital of a Roman province. After that time it rapidly declined, its history became more and more obscure, for more than a thousand years it was completely lost to the civilized world, and, until its discovery by Burckhardt in 1812, except to the wandering Bedouins its very site was unknown.

"And this was the city at whose door I now stood. In a few words, this ancient and extraordinary city is situated within a natural amphitheatre of two or three miles in circumference, encompassed on all sides by rugged mountains five or six hundred feet in height. The whole of this area is now a waste of ruins, dwelling-houses, palaces, temples, and triumphal arches, all prostrate together in undistinguishable confusion. The sides of the mountains are cut smooth, in a perpendicular direction, and filled with long and continued ranges of dwelling-houses, temples, and tombs, excavated with vast labor out of the solid rock; and while their summits present Nature in her wildest and most savage form, their bases are adorned with all the beauty of architecture and art, with columns and porticoes and pediments and ranges of corridors, enduring as the mountains out of which they are hewn, and fresh as if the work of a generation had scarcely yet gone by.

Nothing can be finer than the immense rocky rampart which encloses the city. Strong, firm, and immovable as nature itself, it seems to deride the walls of cities, and the puny fortifications of skilful engineers. The only access is by clambering over this wall of stone, practicable only in one place, or by an entrance the most extraordinary that nature in her wildest freaks has ever framed. The loftiest portals ever raised by the hands of man, the proudest monuments of architectural skill and daring, sink into insignificance by the comparison.

"For about two miles it lies between high and precipitous ranges of rocks, from five hundred to a thousand feet in height, standing as if torn asunder by some great convulsion, and barely wide enough for two horsemen to pass abreast. A swelling stream rushes between them; the summits are wild and broken, in some places overhanging the opposite sides, casting the darkness of night upon the narrow defile; then receding and forming an opening above, through which a strong ray of light is thrown down, and illuminates with the blaze of day the frightful chasm below. Wild fig-trees, oleanders, and ivy, were growing out of the rocky sides of the cliffs hundreds of feet above our heads; the eagle was screaming above us; all along were the open doors of tombs, forming the great necropolis of the city; and at the extreme end was a large open space, with a powerful body of light thrown down upon it, and exhibiting in one full view the façade of a beautiful temple hewn out of the rock, with rows of Corinthian columns and ornaments, standing out fresh and clear as if but yesterday from the hands of the sculptor. Though coming directly from the banks of the Nile, where the preservation of the temples excites the admiration and astonishment of every traveller, we were roused and excited by the extraordinary beauty and excellent condition of the great temple at Petra.

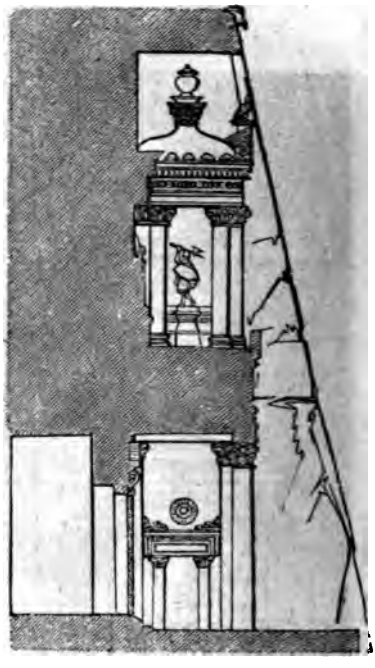
"The whole temple, its columns, ornaments, porticoes, and porches, are cut out from and form part of the solid rock; and this rock, at the foot of which the temple stands like a mere print, towers several hundred feet above, its face cut smooth to the very summit, and the top remaining wild and misshapen as nature made it. The whole area before the temple is perhaps an



Temple of Khasne, at Petra.

acre in extent, enclosed on all sides except at the narrow entrance, and an opening to the left of the temple, which leads into the area of the city by a pass through perpendicular rocks, five or six hundred feet in height.

"It is not my design to enter into the details of the many monuments in this extraordinary city, but to give a general idea of the character of all the excavations, I can not do better than go within the temple. Ascending several broad steps, we entered under a colonnade of four Corinthian columns, about thirty-five feet high, into a large chamber of some fifty feet square, and twenty-five feet high. The outside of the temple is richly ornamented, but the interior is perfectly plain, there being no ornament of any kind upon the walls or ceiling; on each of the three sides is a small chamber for the reception of the dead; and on the back wall of the innermost chamber, I saw the names of Messrs. Legh, Banks, Irby, and Mangles, the four English travellers who with so much difficulty had effected their entrance to the city; of Messieurs Laborde and Linant, and the two Englishmen and Italian of whom I have before spoken; and two or three others, which, from the character of the writing, I supposed to be the names of attendants upon some of these gentlemen.



Sectional View.

"Those were the only names recorded in the temple; and, besides Burckhardt, no other traveller had ever reached it. I was the first American who had ever been there. Many of my countrymen, probably, as was the case with me, have never known the existence of such a city; and independently of all personal considerations, I confess that I felt what I trust was not an inexcusable pride, in writing upon the innermost wall of that temple the name of an American citizen; and under it, and flourishing on its own account in temples, and tombs, and all the most conspicuous places in Petra, is the illustrious name of Paulo Nuozzo, dragomano.

"Leaving the temple, and the open area on which it fronts, and following the stream, we entered another defile much broader than the first, on each side of which were ranges of tombs, with sculptured doors and columns; and on the left, in the bosom of the mountain, hewn out of the solid rock, is a large theatre, circular in form, the pillars in front fallen, and containing thirty-three rows of seats, capable of containing more than three thousand persons. Above the corridor was a range of doors opening to chambers in the rocks, the seats of the princes and wealthiest inhabitants of Petra, and not unlike a row of private boxes in a modern theatre.

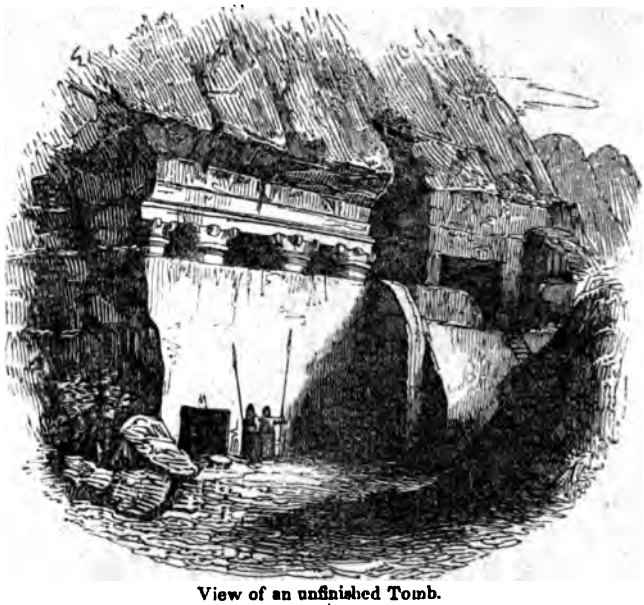
"The whole theatre is at this day in such a state of preservation, that if the tenants of the tombs around could once more rise into life, they might take their old places on its seats, and listen to the declamation of their favorite player. To me the stillness of a ruined city is nowhere so impressive as when sitting on the steps of its theatre; once thronged with the gay and

Amphitheatre at Petra.

pleasure-seeking, but now given up to solitude and desolation. Day after day these seats had been filled, and the now silent rocks had echoed to the applauding shouts of thousands: and little could an ancient Edomite imagine that a solitary stranger, from a then unknown world, would one day be wandering among the ruins of his proud and wonderful city, meditating upon the fate of a race that has for ages passed away.

"All around the theatre, in the sides of the mountains, were ranges of tombs; and directly opposite they rose in long tiers one above another. Having looked into those around the theatre, I crossed to those opposite; and, carefully as the brief time I had would allow, examined the whole range. Though I had no small experience in exploring catacombs and tombs, these were so different from any I had seen, that I found it difficult to distinguish the habitations of the living from the chambers of the dead. The façades or architectural decorations of the front were everywhere handsome; and in this they differed materially from the tombs in Egypt; in the latter the doors were simply an opening in the rock, and all the grandeur and beauty of the work within; while here the door was always imposing in its appearance, and the interior was generally a simple chamber, unpainted and unsculptured.

"I say that I could not distinguish the dwellings from the tombs; but this was not invariably the case; some were clearly tombs, for there were pits in which the dead had been laid, and others were as clearly dwellings, being



View of an unfinished Tomb.

without a place for the deposite of the dead. One of these last particularly attracted my attention. It consisted of one large chamber, having on one side, at the foot of the wall, a stone bench about one foot high, and two or three broad, in form like the divans in the east at the present day; at the other end were several small apartments, hewn out of the rock, with partition-walls left between them, like stalls in a stable, and these had probably been the sleeping apartments of the different members of the family; the

ysteries of bars and bolts, of folding-doors and third stories, being unknown the days of the ancient Edomites. There were no paintings or decora- ons of any kind within the chamber; but the rock out of which it is hewn, te the whole stony rampart that encircled the city, was of a peculiarity and auty that I never saw elsewhere, being a dark ground, with veins of white, ue, red, purple, and sometimes scarlet and light orange, running through in rainbow streaks; and within the chambers, where there had been no posure to the action of the elements, the freshness and beauty of the col- s in which these waving lines were drawn, gave an effect hardly inferior to st of the paintings in the tombs of the kings at Thebes. From its high d commanding position, and the unusual finish of the work, this house, if it may be called, had no doubt been the residence of one who had strutted hour of brief existence among the wealthy citizens of Petra. In front s a large table of rock, forming a sort of court for the excavated dwelling, ere probably, year after year, in this beautiful climate, the Edomite of old under the gathering shades of evening, sometimes looking down upon congregated thousands and the stirring scenes in the theatre beneath, or yond upon the palaces and dwellings in the area of the then populous y.

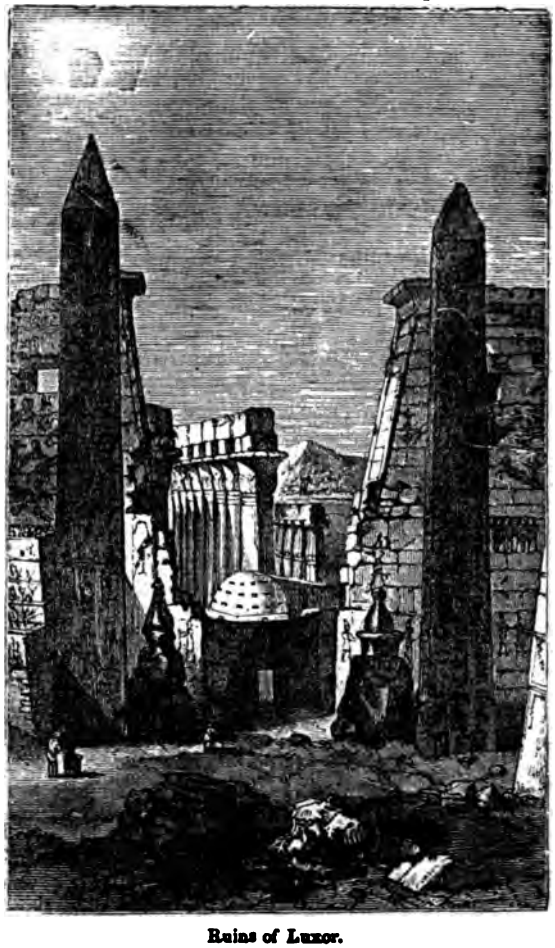
"Farther on, in the same range, though, in consequence of the steps of the eets being broken, we were obliged to go down and ascend again before could reach it, was another temple, like the first, cut out of the solid rock, d, like the first too, having for its principal ornament a large urn, shattered d bruised by musket-balls; for the ignorant Arab, believing that gold is ncealed in it, day after day, as he passes by, levels at it his murderous gun, the vain hope to break the vessel and scatter a golden shower on the ound.

"But it would be unprofitable to dwell upon details. In the exceeding terest of the scene around me, I hurried from place to place, utterly insen- ble to physical fatigue; and being entirely alone, and having a full and un- sturbed range of the ruins, I clambered up broken staircases and among e ruins of streets; and, looking into one excavation, passed on to another d another, and made the whole circle of the desolate city. There, on the ot, everything had an interest which I can not give in description; and if e reader has followed me so far, I have too much regard for him to drag him out after me as I did Paul. I am warned of the consequences by what curred with that excellent and patient follower; for before the day was er, he was completely worn out with fatigue."

Thebes.—All travellers agree that it is impossible to describe the effect oduced by the colossal remains of this ancient capital. No knowledge of tiquity, no long-cherished associations, no searching after something to ad- ire, is necessary here. The wonders of Thebes rise before the astonished ectator, like the creations of some superior power. "It appeared to me," ys Belzoni, "like entering a city of giants, who, after a long conflict, were l destroyed, leaving the ruins of their various temples as the only proofs of eir former existence." Denon's descriptions of the first view of Thebes the French army, which he accompanied in the expedition into upper gypt is singularly characteristic. "On turning the point of a chain of ountains which forms a kind of promontory, we saw all at once ancient hebes in its full extent—that Thebes whose magnitude has been pictured us by a single word in Homer, *hundred-gated*, a poetical and unmeaning pression, which has been so confidently repeated ever since. This city, nowned for numerous kings, who, through their wisdom, have been eleva- d to the rank of gods; for laws which have been revered without being

known; for sciences which have been confided to proud and mysterious inscriptions, wise and earliest monuments of the arts which time has respected; this sanctuary, abandoned, isolated through barbarism, and surrendered to the desert from which it was won; this city, shrouded in the veil of mystery by which even colossi are magnified; this remote city, which imagination has only caught a glimpse of through the darkness of time—was still so gigantic an apparition, that, at the sight of its scattered ruins, the army halted of its owu accord, and the soldiers, with one spontaneous movement, clapped their hands."

Thebes lay on each side of the Nile, and extended also on both sides as far as the mountains. The tombs which are on the western side reach even into the limits of the desert. Four principal villages stand on the site of this ancient city, Luxor and Carnak on the eastern, Gournou and Medinet-Abou on the western side. The temple of Luxor is very near the river, and there is here a good ancient jettée, well built of bricks. The entrance to this temple is through a magnificent gateway facing the north, two hundred feet in front, and fifty-seven feet high above the present level of the soil.



Ruins of Luxor.

Before the gateway stand the two most perfect obelisks that exist, formed, as usual, of the red granite of Syene, and each about eighty feet high, and from eight to ten feet wide at the base. Between these obelisks and the gateway are two colossal statues, also of red granite; from the difference of the dresses it was judged that one was a male, the other a female figure: they are nearly of equal sizes. Though buried in the ground to the chest, they still measure twenty-one and twenty-two feet, thence to the top of the mitre.

It is this gateway that is filled with those remarkable sculptures, which represent the triumph of some ancient monarch of Egypt over an Asiatic enemy, and which we find repeated, both on other monuments of Thebes, and partly also on some of the monuments of Nubia, as for example, at Ipsambul. This event appears to have formed an epoch in Egyptian history, and to have furnished materials for both the historian and the sculptor, like the war of Troy to the Grecian poet. The whole length of this temple is about eight hundred feet.

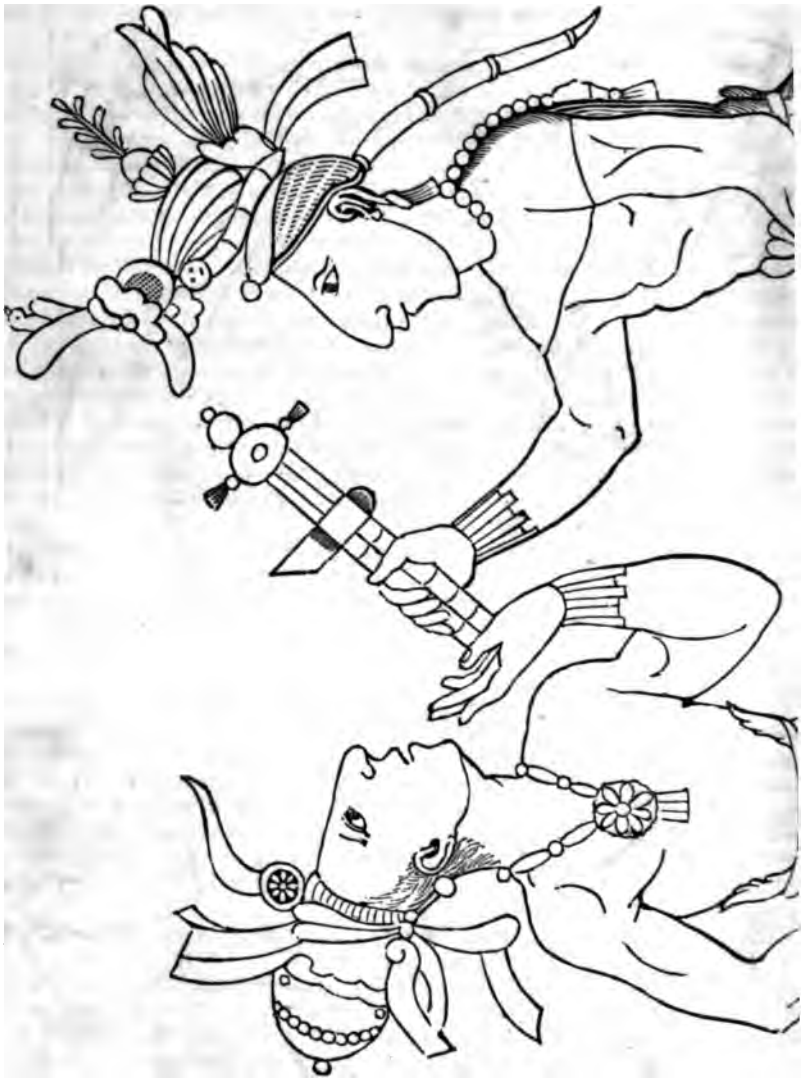
The remains of Carnak, about one mile and a quarter lower down the river, are still more wonderful than Luxor. An irregular avenue of sphinxes, considerably more than a mile in length (about six thousand five hundred and sixty feet), connected the northern entrance of the temple of Luxor with it; but this was only one of several proud approaches to perhaps the largest assemblage of buildings that ever was erected. The irregularities in the structure and approaches of this building, show that the various parts of it were raised at different periods. Some parts, both of this temple and of the larger building at Carnak (sometimes called a palace), have been constructed out of the materials of earlier buildings, as we see from blocks of stone being occasionally placed with inverted hieroglyphics. It is impossible, without good drawings and very long descriptions, to give anything like an adequate idea of the enormous remains of Carnak, among which we find a hall whose roof of flat stones is sustained by more than one hundred and thirty pillars, some twenty-six feet, and others as much as thirty-four feet, in circumference.

The remains on the western side of the river are, perhaps, more interesting than those on the east.

That nearly all the monuments of Thebes belong to a period anterior to the Persian conquest, B. C. 525, and that among them we must look for the oldest and most genuine specimens of Egyptian art, is clear, both from the character of the monuments themselves and from historical records; nor is this conviction weakened by finding the name of Alexander twice on part of the buildings at Carnak, which will prove no more than that a chamber might have been added to the temple and inscribed with his name; or that it was not unusual for priests to flatter conquerors or conquerors' deputies, by carving on stone the name of their new master.

Palenque.—In the year 1750, some Spaniards travelling in Mexico, penetrated to the lands north of Carmen, in the province of Chiapas, when they found in a vast solitude many ancient stone buildings, the remains of a city, still embracing from eighteen to twenty-four miles in extent, known to the Indians by the name of Casas de Piedras. The existence of such a city was entirely unknown; there is no mention of it in any book, and no tradition that it ever had been. To this day the only appellation given to it is that of Palenque, after the village near which the ruins stand.

The news of the discovery passed from mouth to mouth, was repeated in some cities of the province, and reached the seat of government; but little attention was paid to it, and the members of the government took no measures to explore the ruins till 1786, when the king of Spain ordered an exploration



Frescoes at Palenque.

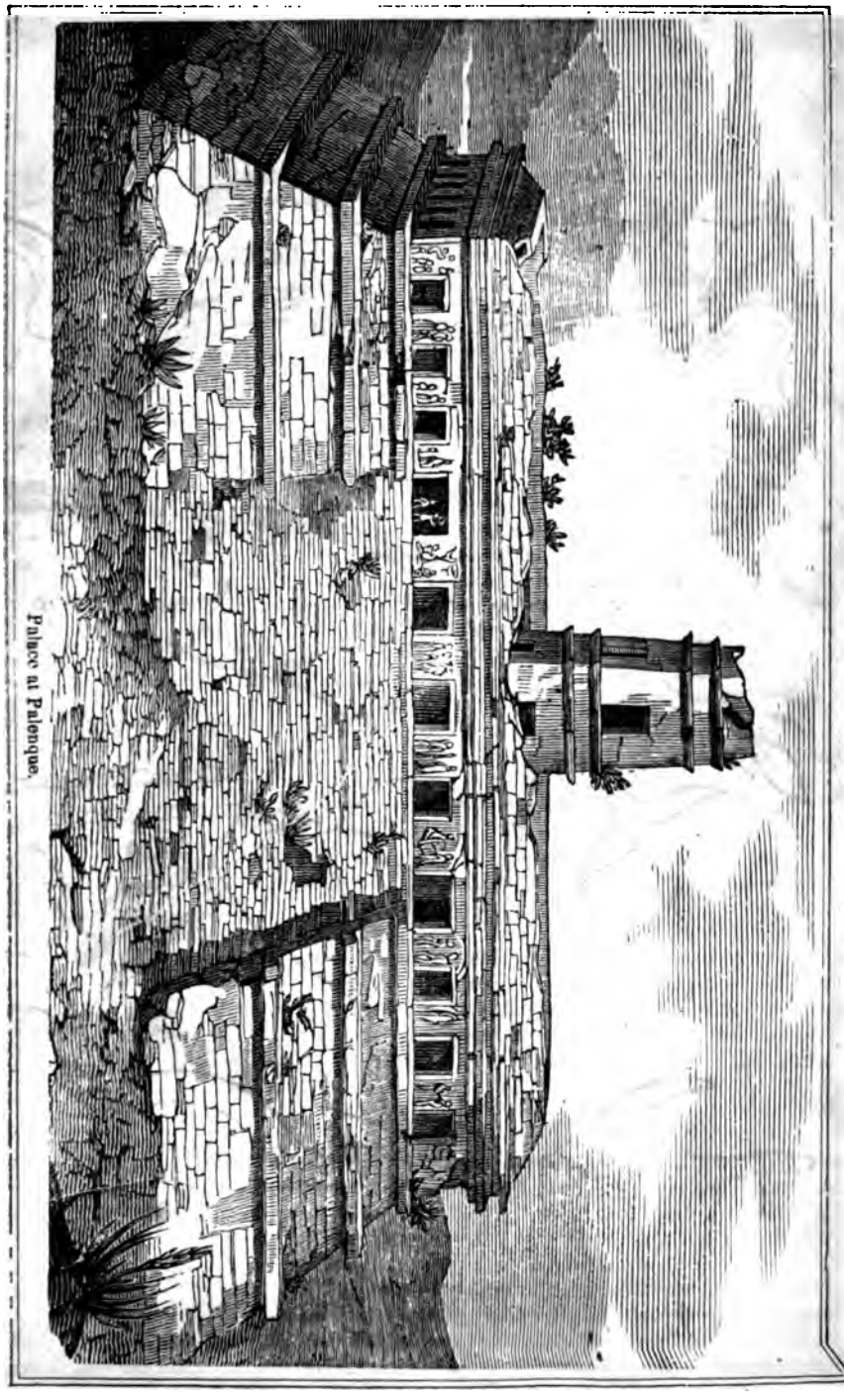
In May, 1787, Antonio del Rio arrived at the village, under a commission from the government of Guatemala, and proceeded to the site of the ruined city. In his official report he says, on making his first essay, owing to the thickness of the woods, and a fog so dense that it was impossible for the men to distinguish each other at five paces' distance, the principal building was completely concealed from their view. He returned to the village, and after concerting measures with the deputy of the district, an order was issued to the inhabitants of Tumbula, requiring Indians with axes and billhooks; and with these he again moved forward, and immediately commenced felling trees, which was followed by a general conflagration.

The report of Del Rio, with the commentary of Dr. Cabrera, of New Guatemala, deducing an Egyptian origin for the people, through the supineness or jealousy of the Spanish government was locked up in the archives of Guatemala until the revolution, when, by the operation of liberal principles, the original manuscripts came into the hands of an English gentleman long resident in that country, and an English translation was published at London in 1822. This was the first notice in Europe of the discovery of these ruins; and, instead of electrifying the public mind, either from want of interest in the subject, distrust, or some other cause, but little notice was taken of it.

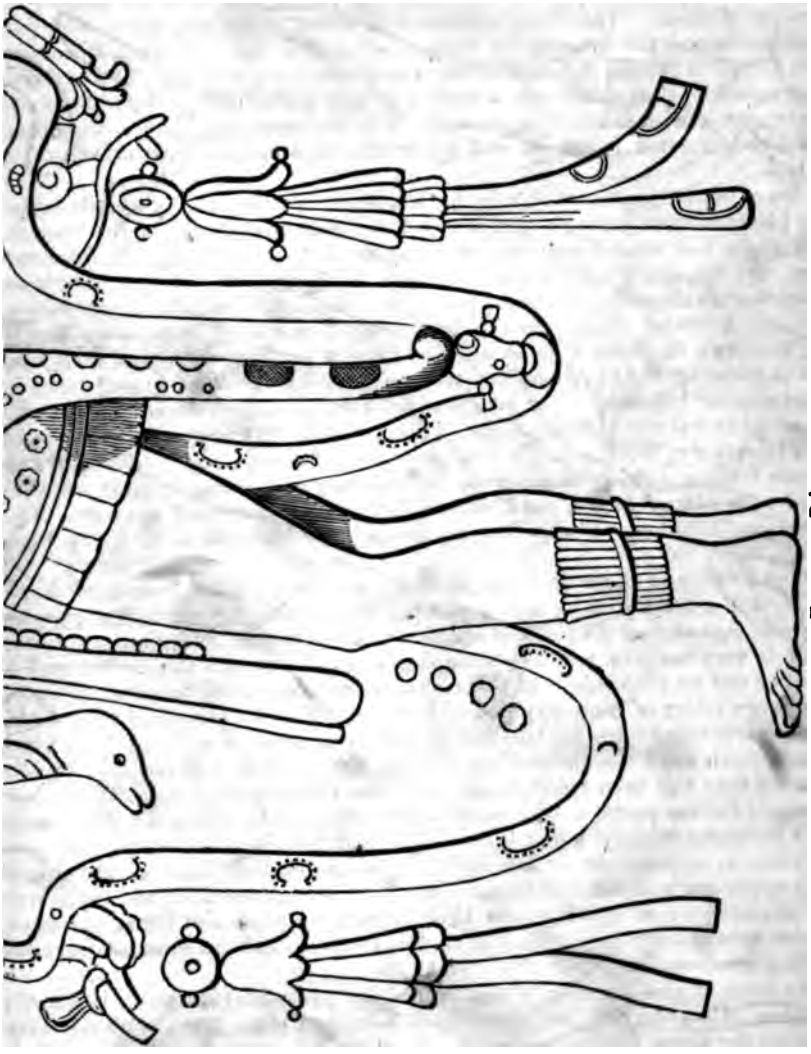
While the report and drawings of Del Rio were in the archives of Guatemala, Charles IV. of Spain ordered another expedition, under Captain Dupaix, with a secretary and draughtsman, and a detachment of dragoons. His expeditions were made in 1805–'7, the last of which was to Palenque.

The manuscripts of Dupaix, and the designs of his draughtsman Castenada, were about to be sent to Madrid, which was then occupied by the French army, when the revolution broke out in Mexico; they then became an object of secondary importance, and remained during the wars of independence under the control of Castenada, who deposited them in the Cabinet of Natural History in Mexico. In 1828 M. Baradere disentombed them from the cartons of the museum, where, but for this accident, they might still have remained, and the knowledge of the existence of this city again been lost.

One of the principal buildings in Palenque is shown in the engraving on *the opposite* page. It stands on an artificial elevation of an oblong form,



Palace at Palenque.



Frescoes at Palenque.

forty feet high, three hundred and ten feet in front and rear, and two hundred and sixty feet on each side. This elevation was formerly faced with stone, which has been thrown down by the growth of trees, and its form is hardly distinguishable.

The building stands with its face to the east, and measures two hundred and twenty-eight feet front by one hundred and eighty feet deep. Its height is not more than twenty-five feet, and all around it had a broad projecting cornice of stone. The front contained fourteen doorways, about nine feet wide each, and the intervening piers are between six and seven feet wide. But six piers remain entire, and the rest of the front is open. The building was constructed of stone, with a mortar of lime and sand, and the whole front was covered with stucco and painted. It is enclosed by a richly-ornamented border, about ten feet high and six wide—of which only a part now remains.

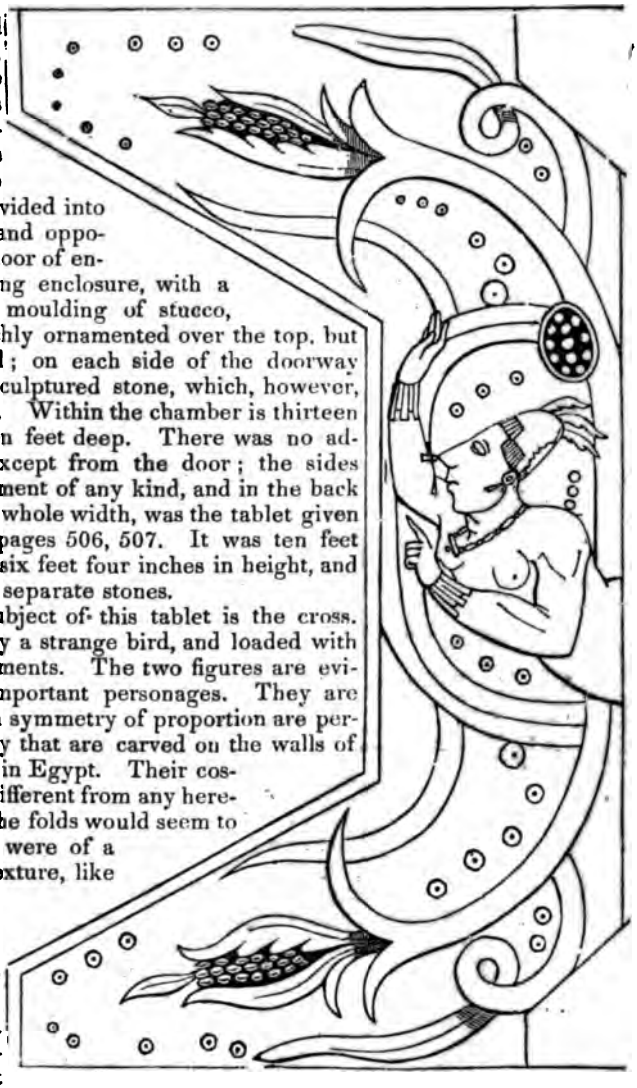
From the palace no other building is visible. Passing out by what is called the subterraneous passage, you descend the southwest corner of the terrace, and at the foot immediately commence ascending a ruined pyramidal structure, which appears once to have had steps on all its sides. These steps have been thrown down by the trees, and it is necessary to clamber over stones, aiding the feet by clinging to the branches. The ascent is so steep, that if the first man displaces a stone it bounds down the side of the pyramid, and wo to those behind! About half way up, through openings in the trees, is seen another building. The height of the structure on which it stands is one hundred and ten feet on the slope. The building is seventy-six feet in front and twenty-five feet deep. It has five doors and six piers, all standing. The whole front was richly ornamented in stucco, and the corner piers are covered with hieroglyphics, each of which contains ninety-six squares. The piers are ornamented with human figures, two on each side, facing each other.

The interior of the building is divided into two corridors, running lengthwise, with a ceiling rising nearly to a point, as in the palace, and paved with large square stones. The front corridor is seven feet wide. The separating wall is very massive, and has three doors, a large one in the centre, and a smaller one on each side. In this corridor, on each side of the principal door, is a large tablet of hieroglyphics, each thirteen feet long and eight feet high, and each divided into two hundred and forty squares of characters or symbols. Both are set in the wall so as to project three or four inches. In one place a hole had been made in the wall close to the side of one of them, apparently for the purpose of attempting its removal, by which we discovered that the stone is about a foot thick. The sculpture is in bas-relief.

There is no staircase or other visible communication between the lower and upper parts of this building, and the only way of reaching the latter was by climbing a tree which grows close against the wall, and the branches of which spread over the roof. The roof is inclined, and the sides are covered with stucco ornaments.

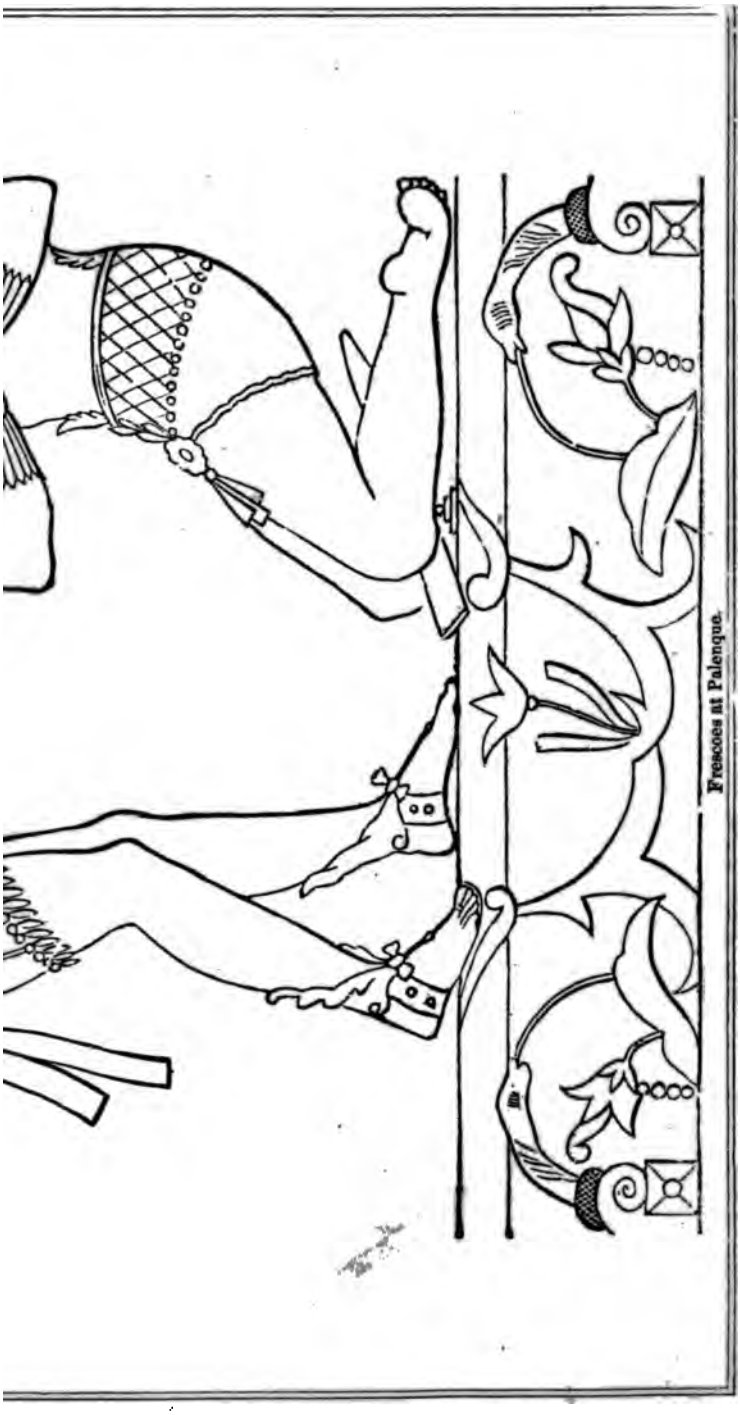
In front of this building, at the foot of the pyramidal structure, is a small stream. Crossing this, we come upon a broken stone terrace about sixty feet on the slope, with a level esplanade at the top, one hundred and ten feet in breadth, from which rises another pyramidal structure, now ruined and overgrown with trees; it is one hundred and thirty-four feet high on the slope, and on its summit is a building shrouded among trees. This building is fifty feet front, thirty-one feet deep, and has three doorways. The whole front was covered with stuccoed ornaments. The two outer piers contain

hieroglyphics; one of the inner piers is fallen, and the other is ornamented with a figure in bas-relief, but faded and ruined.



The interior of this also is divided into two corridors, running lengthwise—with ceilings as before—and pavements of very large square stones. The back corridor is divided into three apartments, and opposite the principal door of entrance is an oblong enclosure, with a heavy cornice or moulding of stucco, and a doorway richly ornamented over the top, but now much defaced; on each side of the doorway was a tablet of sculptured stone, which, however, has been removed. Within the chamber is thirteen feet wide and seven feet deep. There was no admission of light except from the door; the sides were without ornament of any kind, and in the back wall, covering the whole width, was the tablet given in the engraving, pages 506, 507. It was ten feet eight inches wide, six feet four inches in height, and consisted of three separate stones.

The principal subject of this tablet is the cross. It is surmounted by a strange bird, and loaded with indescribable ornaments. The two figures are evidently those of important personages. They are well drawn, and in symmetry of proportion are perhaps equal to many that are carved on the walls of the ruined temples in Egypt. Their costume is in a style different from any heretofore given, and the folds would seem to indicate that they were of a soft and pliable texture, like cotton. Both are looking toward the cross, and one of them seems in the act of making an offering, perhaps of a child. All speculations on the subject of these representations are of course entitled to little regard, but perhaps it would not be wrong to ascribe to these personages a sacerdotal character. The hieroglyphics doubtless explain all. Near them are other hieroglyphics, which reminded us of the Egyptian mode for recording the name, history, office, or character, of the persons represented. This tablet of the cross has given rise to more learned speculations than perhaps any others found at Palenque. Dupaix and his commentators, assuming for the building a very remote antiquity, or at least a period long antecedent to the Christian era, account for the appearance of the cross by the argument that it was known



Frescoes at Palenque.

and had a symbolical meaning among ancient nations long before it was established as the emblem of the Christian faith.

There is reason to believe that this particular building was intended as a temple, and that the enclosed inner chamber was an adoratorio, or oratory, or altar. What the rites and ceremonies of worship may have been, no one can undertake to say.

From the foot of the elevation on which the last-mentioned building stands, their bases almost touching, rises another pyramidal structure of about the same height. Such is the density of the forest, even on the sides of the pyramidal structure, that, though in a right line but a short distance apart, one of these buildings can not be seen from the other.

The interior is divided into two corridors, about nine feet wide each, and paved with stone. In several places on each side are holes, which are found also in all the other corridors; they were probably used to support poles for scaffolding while the building was in process of erection, and had never been filled up.

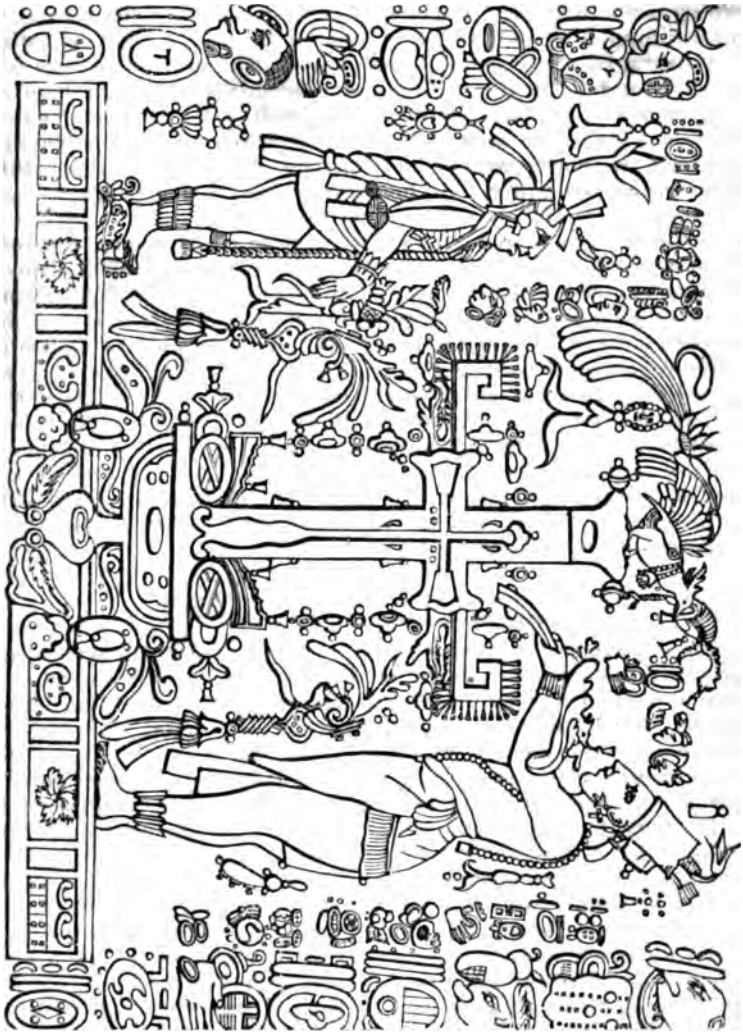
The pier on each side of the doorway contained a stone tablet, with figures carved in bas-relief, one of which is represented in our engraving. The two figures stand facing each other, the first on the right hand, fronting the spectator. The nose and eyes are strongly marked, but altogether the development is not so strange as to indicate a race entirely different from those which are known. The headdress is curious and complicated, consisting principally of leaves of plants, with a large flower hanging down; and among the ornaments are distinguished the beak and eyes of a bird, and a tortoise. The cloak is a leopard's skin, and the figure has ruffles around the wrists and ankles.

The second figure, standing on the left of the spectator, has the same profile which characterizes all the others at Palenque. Its headdress is composed of a plume of feathers, in which is a bird holding a fish in its mouth; and in different parts of the headdress, there are three other fishes. The figure wears a richly-embroidered tippet, and a broad girdle, with the head of some animal in front, sandals, and leggings: the right hand is extended in a prayerful or deprecating position, with the palm outward. Over the heads of these mysterious personages are three cabalistic hieroglyphics.

We considered the oratorio or altar the most interesting portion of the ruins of Palenque; we could not but regard it as a holy place, dedicated to the gods, and consecrated by the religious observances of a lost and unknown people. Comparatively, the hand of ruin has spared it, and the great tablet, surviving the wreck of elements, stands perfect and entire. Lonely, deserted, and without any worshippers at its shrine, the figures and characters are distinct as when the people who reared it went up to pay their adorations before it. To us it was all a mystery—silent, defying the most scrutinizing gaze and reach of intellect. Even our friends the padres could make nothing of it.

Near this, on the top of another pyramidal structure, was another building entirely in ruins, which apparently had been shattered and hurled down by an earthquake. The stones were strewed on the side of the pyramid, and it was impossible even to make out the ground-plan.

Returning to the large building and proceeding south, at a distance of fifteen hundred feet, and on a pyramidal structure one hundred feet high from the bank of the river, is another building, twenty feet front and eighteen feet deep, but in an unfortunately ruined condition. The whole of the front wall has fallen, leaving the outer corridor entirely exposed. Fronting the door, and against the back wall of the inner corridor, was a large stucco ornament



Altar at Palenque.

representing a figure sitting on a couch; but a great part has fallen or been taken off and carried away.

For these remarkable and interesting details of the most curious ruins in the world, we are indebted to JOHN L. STEPHENS, Esq., whose "Incidents of Travel" have thrilled the bosom of many Americans, and excited a curiosity which will lead to further discoveries. In conclusion, Mr. Stephens remarks:—

Here were the remains of a cultivated, polished, and peculiar people, who had passed through all the stages incident to the rise and fall of nations; reached their golden age, and perished, entirely unknown. The links which connected them with the human family were severed and lost, and these were the only memorials of their footsteps upon earth. We lived in the ruined palace of their kings; we went up to their desolate temples and fallen altars; and wherever we moved we saw the evidences of their taste, their skill in arts, their wealth and power. In the midst of desolation and ruin we looked back to the past, cleared away the gloomy forest, and fancied every building perfect, with its terraces and pyramids, its sculptured and painted ornaments, grand, lofty, and imposing, and overlooking an immense inhabited plain; we called back into life the strange people who gazed at us in sadness from the walls; pictured them, in fanciful costumes and adorned with plumes of feathers, ascending the terraces of the palace and the steps leading to the temples; and often we imagined a scene of unique and gorgeous beauty and magnificence, realizing the creations of oriental poets—the very spot which fancy would have selected for the "Happy Valley" of Rasselas. In the romance of the world's history nothing ever impressed me more forcibly than the spectacle of this once great and lovely city, overturned, desolate, and lost; discovered by accident, overgrown with trees for miles around, and without even a name to distinguish it. Apart from everything else, it was a mourning witness to the world's mutations.

"Nations melt
From Power's high pinnacle, when they have felt
The sunshine for a while, and downward go."

DENDERA presents some very striking examples of that sumptuous architecture which the people of Egypt lavish upon their places of worship. The gateway in particular, which leads to the temple of Isis, has excited universal admiration. Each front, as well as the interior, is covered with sculptured hieroglyphics, which are executed with a richness, a precision, elegance of form, and variety of ornament, surpassing in many respects the similar edifices which are found at Thebes and Philoe. The height is forty-two feet, the width thirty-three, and the depth seventeen. "Advancing along the brick ruins," says Dr. Richardson, "we came to an elegant gateway, which is also sandstone, neatly hewn, and completely covered with sculpture and hieroglyphics, remarkably well cut. Immediately over the centre of the doorway is the beautiful Egyptian ornament usually called the globe, with serpent and wings, emblematical of the glorious sun poised in the airy firmament of heaven, supported and directed in his course by the eternal wisdom of the Deity. The sublime phraseology of Scripture, 'the Sun of Righteousness shall rise with healing on his wings,' could not be more emphatically or more accurately represented to the human eye, than by this elegant device." The temple itself still retains all its original magnificence. The centuries which have elapsed since the era of its foundation, have scarcely affected it in any important part, and have impressed upon it no greater appearance of age than serves to render it more venerable and imposing. Here were concentrated the united labors of ages, and the last effort of human art and indus-

y, in that uniform line of construction which had been adopted in the ear-
est times.

The portico consists of twenty-four columns, in three rows; each above
wenty-two feet in circumference, thirty-two feet high, and covered with hiero-
yphics. On the front, Isis is in general the principal figure to whom offer-
gs are made. On the architrave are represented two processions of men

Ruins of Dendera.

nd women bringing to their goddess and to Osiris, who is sitting behind her,
lobes encompassed with cows' horns, mitred snakes, lotus-flowers, vases,
ttle boats, graduated staffs, and other instruments of their emblematical wor-
ip. The interior of the pronaos is adorned with sculptures, most of them
reserving part of the paint with which they have been covered. Those on
e ceiling are peculiarly rich and varied, all illustrative of the union between
e astronomical and religious creeds of the ancient Egyptians; yet, though
ach separate figure is well preserved and perfectly intelligible, we must be
ore intimately acquainted with the real principles of the sciences, as they
ere then taught, before we can undertake to explain the signs in which they
ere embodied.

The sekos, or interior of the temple, consists of several apartments, all the
alls and ceilings of which are in the same way covered with religious and
stronomical representations. The roofs, as is usual in Egypt, are flat, formed
f oblong masses of stone resting on the side-walls: and when the distance be-
ween these is too great, one or two rows of columns are carried down the
iddle of the apartment, on which the huge flags are supported. The capi-
als of these columns are very richly ornamented with the budding lotus, the
talks of which, being extended a certain way down the shaft, give it the ap-
earance of being fluted, or rather scolloped. The rooms have been lighted
y small perpendicular holes cut in the ceiling, and where it was possible to
ntroduce them, by oblique ones in the sides. But some idea might be formed
f the perpetual gloom in which the apartments on the ground-floor of the
ekos must have been buried, from the fact, that where no side-light could
e introduced, all they received was communicated from the apartment above;
o that, notwithstanding the cloudless sky and the brilliant colors on the walls,

the place must have been always well calculated for the mysterious practices of the religion to which it was consecrated. On one corner of the roof there was a chapel or temple twenty feet square, consisting of twelve columns, exactly similar in figure and proportions to those of the pronaos. The use to which it may have been applied, must probably remain one of the secrets connected with the mystical and sometimes cruel service in which the priests of Isis were employed, though it is by no means unlikely that it was meant as a repository for books and instruments collected for the more innocent and exalted pursuits of practical astronomy.

The western wall of the great temple is particularly interesting for the extreme elegance of the sculpture, as far as Egyptian sculpture is susceptible of that character—for the richness of the dresses in which the priests and deities are arrayed, and even of the chairs in which the latter are seated. Here are frequent representations of men who seem prepared for slaughter, or just going to be put to death. On these occasions, one or more appear with their hands or legs tied to the trunk of a tree, in the most painful and distorted attitudes.

The grand projecting cornice, one of the most imposing features of Egyptian architecture, is continued the whole length of this and the other walls; a moulding separates it from the architrave; and, being carried down the angles of the building, gives to the whole, a solid, finished appearance, combined with symmetry of parts and chasteness of ornament.

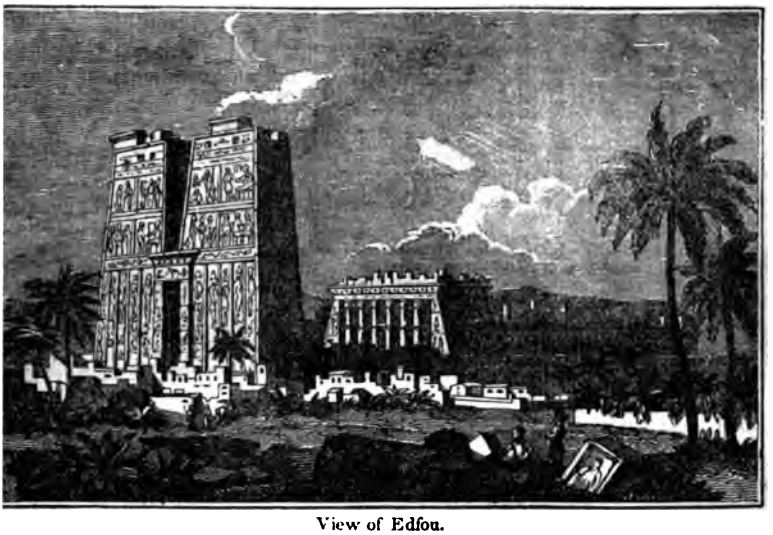
In a small chapel behind the temple, the cow and the hawk seem to have been particularly worshipped, as priests are frequently seen kneeling before them, presenting sacrifices and offerings. In the centre of the ceiling is the same front face of Isis, in high relief, illuminated, as it were, by a body of rays, issuing from the mouth of the same long figure, which, in the other temples, appears to encircle the heavenly bodies. About two hundred yards eastward from this chapel, is a propylon of small dimensions, resembling in form that which conducts to the great temple, and, like it, built in a line with the wall which surrounds the sacred enclosure. Among the sculptures on it, which appear of the same style, but less finished than those on the large temple, little more is worthy of notice than the frequent exhibition of human slaughter by men or by lions. Still further toward the east, there is another propylon, equally well preserved with the rest, about forty feet in height, and twenty feet square at the base. Among these sacred figures on this building, is an Isis pointing with a reed to a graduated staff, held by another figure of the same deity, from which are suspended scales containing water-animals; the whole group, perhaps, being an emblem of her influence over the Nile, in regulating its periodical inundations.

The enclosure, within which all the sacred edifices of Dendera, with the exception of the last propylon, are contained, is a square of about a thousand feet. It is surrounded by a wall, which, where best preserved, is thirty-five feet high, and fifteen feet thick. The crude bricks of which it is built were found to be fifteen and a half inches long, seven and three quarters broad, and four and three quarters inches thick. There have been, at certain intervals, projections of the wall or towers; but it is difficult to say whether for purposes of defence or strength.

Dr. Richardson observes, in reference to the sculptures on the temple of Dendera, that "the female figures are so extremely well executed, that they do all but speak, and have a mildness of feature and expression that never was surpassed." Everything around appears to be in motion, and to discharge the functions of a living creature; being, at the same time, so different from what is ever seen in Europe, that the mind is astonished, and feels

absolutely introduced to personages of the remotest ages, to converse them, and to witness the ceremonies by which they delighted to honor gods. The temple at Dendera, says this author, is by far the finest in pt; the devices have more soul in them: and the execution is of the cest description.

DFOU, the Apollinopolis Magna of the Greeks, presents several architec- l remains worthy of notice. There are two temples in a state of great ervation; one of them consisting of high pyramidal propyla, a pronaos, ico, and sekos, the form most generally used in Egypt; the other is ptoral, and is, at the same time, distinguished by having, on its several mns, the appalling figure of Typhon, the emblem of the evil principle. he pyramidal propylon, which forms the entrance to the greater temple, ne of the most imposing monuments extant of Egyptian architecture h of the sides is a hundred feet in length, thirty wide, and a hundred high y of the figures sculptured on it are thirty feet in height, and are execu- in so masterly and spirited a style, as to add considerably to the grand t of the building. In each division there is a staircase of one hundred fifty or one hundred and sixty steps, which conduct the visiter into spa- s apartments at different elevations. The horizontal sections of each diminish gradually from one hundred feet by thirty, to eighty-three by ty, as will appear to the eye from the accompanying engraving, although



View of Edfou.

solidity and height of the propylon give it more the aspect of a fortress lace of defence, than of the approach to a religious edifice. As an ex- ation of this peculiarity, we are told that the addition of these gateways temple was permitted as a favor to such of the ancient kings of Egypt, for their pious and beneficent actions, became entitled to perpetuate their es in the mansions of their gods. The Ptolemys, who claimed the right overeignty from conquest, indulged in the same magnificence, and built ticoes, propyla, and even temples. Cleopatra, in her misfortunes, is said ave removed with the most valuable [illegible]art of her property to an edifice of ry extraordinary size and structure, [illegible]ich she had formerly erected near fane of Isis. Most probably, it was [illegible]ropylon of the kind just described.

Nothing could be better adapted for her purpose; inasmuch as the variety of apartments offered every convenience that could be desired, and when the small door at the bottom of the staircase was closed, it was perfectly inaccessible.

In no part of Egypt are more colossal sculptures seen on the walls of a public building, than on the larger temple at Edfou. These, we are told, are extremely well executed, and in some cases the colors are still completely unchanged. Priests are seen paying divine honors to the scarabæus, or beetle, placed upon an altar—an insect which is said to have been typical of the sun, either because it changes its appearance and place of abode every six months, or because it is wonderfully productive. We regret to find that both the temples, though well preserved, are almost concealed among heaps of dirt and rubbish; indeed the terrace of the larger one is occupied by several mud-cottages belonging to the villagers, and the interior chambers of the sekos are indiscriminately used as sinks, granaries, or stables.

In Nubia and Abyssinia ruins also exist. Near the parallel of the twenty-first degree of latitude, and about four hundred paces from the western bank,

Ruins of the Temple of Soleb from the Northeast.

stand the ruins of the temple of Soleb. In advancing toward it, the eye is first attracted by an elevated stone foundation, thirty feet in thickness, extending in front of the temple, and of equal length with the portal.

The remains of two sphinxes are seen at either side of the approach, where there was a staircase which led to the main building, now in a state of complete dilapidation. The front of the portal, of which only a part is left, is about a hundred and seventy-five feet long; and the width of the steps is not less than fifty-seven feet. The wall, which is twenty-four feet thick, is not solid, but contains a variety of cells, set apart, it may be presumed, for a variety of uses, no longer obvious to the uninitiated.

The first chamber is more than a hundred feet in breadth, and eighty-nine in depth; round three sides of which runs a single row of pillars, while on the fourth there are indications of a double row; making in the whole thirty columns, of which seven are still standing and perfect. They seem all to have been executed from the same model; the diameter of the base being sixty-seven inches, and the height [illegible] forty feet. They are inscribed with

hieroglyphics only, and exhibit no figures which can properly be referred to the hand of a sculptor.

There is a second chamber, in which it is still possible to trace a row of twenty-four pillars resembling those in the first; but their fragments are scattered about in every direction. The very bases of some of them are rooted up, and the mud-foundation on which they stood is completely exposed. So entire yet so partial a ruin, it is remarked, can only be attributed to the sudden yielding of the ground; for an earthquake would not have spared the columns which remain in other parts of the edifice.

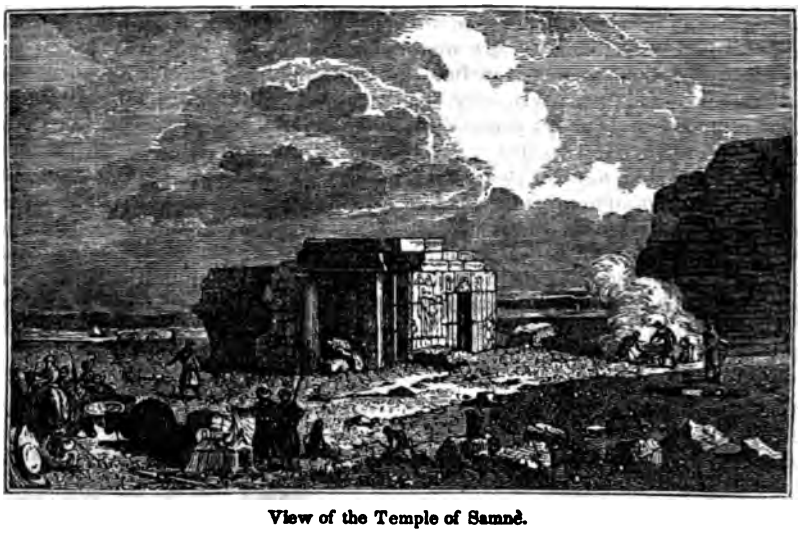
Mr. Waddington observes, that the temple of Soleb affords the lightest specimen he had anywhere seen of Egyptian or Ethiopian architecture. The sandstone, of which most of the columns are composed, is beautifully streaked with red, giving them from a distance a rich and glowing tint. As the walls have almost entirely disappeared, and the roof fallen in, there remains no ponderous heap of masonry to destroy the effect of these beautiful pillars, backed by the mountains of the desert, or the clear blue horizon. Here the man of taste does not contemplate a gloomy edifice, where heaviness is substituted for dignity, height for sublimity, and size for grandeur, nor measures a pyramidal mass of stonework, climbing up to heaven in defiance of nature and propriety. "We seemed," says the traveller just named, "to be at Segesta, at Phigalea, or at Sunium, where lightness, and color, and elegance of proportion, contrasted with the gigantic scenery about them, make the beauty of the buildings yet more lovely, and their durability more wonderful. There is no attempt to imitate or rival the sublimity that surrounds them; they are content to be the masterpieces of art, and therefore they and nature live on good terms together, and set off each other's beauty Those works that aim at more than this, after exhausting treasuries, and costing the lives and happiness of millions, must be satisfied at last to be called hillocks."

El Bellal.

In the kingdom of Merawe there are some magnificent monuments, near the spot which is supposed to have contained the ancient capital. Among other ruins are the remains of seven temples, of which the largest is four hundred and fifty feet long, by one hundred and fifty-nine broad. The principal apartment is one hundred and forty-seven feet by one hundred and eleven, and the next is one hundred and twenty-three by one hundred and two. This edifice is, generally speaking, in a very ruined state; and some of the materials are in so confused and shattered a position, as to indicate that they had been broken down and unskilfully replaced. The other temples are of much smaller dimensions, but several of them more perfectly preserved; and in two, most of the cham-

bers are excavated in the solid rock. This is part of a lofty eminence, called Gebel el Berkall or the Holy mountain, along the foot of which all the monuments are erected. Here are also seventeen pyramids, while at El Bellal (a view of which is given on the preceding page), seven miles further up the river, there is a more numerous and lofty range of these structures, none of which, however, rival those of Memphis. A general character of ruin pervades the whole, and some, indeed, are reduced masses of mere rubbish; a state which seems at least partly owing to the friable nature of the sandstone used by their architects. The sculptures and ornaments which can still be traced, bear marks of very different periods of art; some being extremely rude, and others nearly as perfect as any in the palaces of Egypt."

The temple of Samnè, a view of which, taken from the west, is given below, also deserves attention. It is built of sandstone, and differs in its shape



View of the Temple of Samnè.

from other Egyptian edifices. It consists of a principal building about thirty-six feet in length, and nine in width. On each side originally stood four small pillars, of which two remain on the one hand and three on the other; one of the former has a polygonal shaft, the remainder being square; they are all covered with sculptures, and the pillars are joined to the main building by blocks of stone, which serve as a roof to the vestibule. The inner walls of the apartment are adorned with hieroglyphics, and mystic representations of the divine worship. On both sides a long ship is delineated, with Osiris in it; and the group of two figures resting their hands upon each other's shoulder, is everywhere repeated. The roof is painted blue, and there are some remains of color on several of the carvings.

Near the back-wall, opposite the main entrance, a statue about five feet in length lies on the floor, the head of which has been cut off; the arms are crossed upon the breast, while in one hand is the flail, and in the other the instrument usually called a crosier. On the outer wall, Burckhardt distinguished some figures of Mendes, the Jupiter Ammon of the Greeks and later Egyptians. All the sculptures are rather coarsely executed; and the lines dividing the compartments wherein the hieroglyphics are cut, are not straight, the effect of either intention or great ignorance in the first principles of art.

The same remark applies to the architectural labors of the Hindoos, in which there are constant deviations from rectilinear position, even in their arrangement of the finest columns. Some of the hieroglyphics on the pillars have evidently been left unfinished, and those which are completed do not appear to have proceeded from the hand of a master.

THE GREAT WALL OF CHINA.—One of the greatest curiosities of the artificial kind that China affords, and which may be reckoned one of the most astonishing remains of antiquity now in the world, is that prodigious wall, which was built by the Chinese to prevent the frequent incursions of the Tartars. This wall, Du Halde informs us, is higher and broader than the common walls of the cities of China; that is, about twenty-five feet in height, and broad enough for six horsemen to ride abreast upon it; and it is fortified all along with strong square towers at proper distances, to the number of 3,000, which, in the time of the Chinese monarchs, before the Tartars subdued the country, used to be guarded by a million of soldiers. The whole length of it, with all its windings, is computed at near 1,500 miles, running all along the three northern provinces of Pekeli, Shansi, and Shensi, and built on some places which seem inaccessible, as well as over rivers and such marshes and sandy hollows, as appear utterly incapable of admitting a foundation for so weighty a structure. It is chiefly built of brick, and so strongly cemented with an extraordinary kind of mortar, that though it has now stood above 2,000 years, exposed to all winds and weathers, it is very little decayed; and the terrace on the top seems still as firm as ever. This amazing wall was built by the emperor Chihohamt, according to some authors, or Tsinshi-whang, according to Du Halde, above two hundred years before the birth of our Savior; and, though of such stupendous length and bulk, and carried on over mountains and valleys, it was completed within the space of five years, if we may credit the Chinese tradition.

THE PICTS' WALL.—This wall is one of the most remarkable remains of Roman antiquity in Great Britain. It runs the whole breadth of the island, through the counties of Cumberland and Northumberland, and extends above eighty miles from Solway Frith on the west, to the German ocean at the mouth of the Tyne on the east. The Romans, who built it as a barrier against the hostile incursions of the North Britons, called it Vallum Barbaricum, but in later ages it has been generally called "the Picts' wall."

The emperor Adrian first threw up a wall of earth, strengthened with large stakes driven into the ground, and wreathed together with wattles. This was repaired by Severus, in the year 123, and several stone fortresses or turrets were added to it, that an alarm might be given from one to another by the sound of a trumpet. The famous general Ætius rebuilt it with stone about the year 430, but it was soon ruined by the Picts, and no longer regarded but as a boundary between the two nations.

The remains of this wall may be easily traced, though in most places the foundation only is discernible, with the trench before it on the north, and some little towers or mile castles on the south; the greater part of the stones having been removed to build houses, or to make enclosures about the neighboring grounds. About ten miles east of Carlisle, it runs up a high hill, and thence to its crossing the river Irthing, it runs through a large waste, where it remains entire, to the height of five or six feet. From Thirlewall castle, not far eastward of the Irthing, the wall is continued over a range of steep and rugged rocks, that extends nine miles. The highest part now standing, is about half a mile from Thirlewall bankhead, where it is nine feet high; and at this place are some vestiges of a Roman city surrounded by a deep trench.

At Seavenshale, on the north side of the wall, are still to be seen the ruins of a Roman castle curiously vaulted underneath; at Carrow-brough, about a mile and a half distant, are several traces of another ancient city; and at Postgate is a square Roman tower, now converted into a dwelling-house.

Before the wall on the north, is a deep broad ditch, except between Thirlewall bankhead and Seavenshale, where it is sufficiently secured by the steepness of the rocks on which it is built. The ditch is in most places thirty-six feet broad, and five feet deep; and a military stone causeway seems to have run at twenty or thirty yards' distance on the south side, which, between Postgate and Carrow, is but little decayed.

In the Picts' wall have been found, upon various occasions, pieces of tubes or pipes, which are supposed to have been artfully laid in the wall, between each turret, for giving notice of the approach of an enemy; so that any important intelligence could be communicated from sea to sea in the space of an hour. Here also have been found many coins, altars, and statues; and among the rest, a brazen image about six inches long, supposed to have been the statue of the god Terminus, which the Romans used to lay in the foundation of their boundaries.

Ruins of Milo.—The ruins of the ancient theatre on the island of Milo generally escape notice, and few modern travellers mention them, though they are not less considerable than many of the remains elsewhere which have been so often and particularly described, while the site they occupy is one of almost matchless beauty. On the side of a conical hill, somewhat lower than the summit on which the town stands, and a little to the northwest of it is a natural hollow of an elliptical form, and round this the ancients built their stone seats in ranges above each other, leaving these to be backed by the hill itself, and the whole open to the bright heavens above them. From this lofty position, on the face of the rock, the view is enchanting. The blue waters of the Mediterranean, at a great depth below, roll at the feet of the spectator, and stretch far away before him, dotted with numerous islands. Nothing intercepts the view. Whatever may have been the character of the representations and amusements that attracted the ancients to this spot, the exquisite spectacle of nature here presented—the purity of the air, the glorious brilliancy of the sun, and the transparency of the atmosphere, so seldom clouded in this happy clime—ought at once to have filled their souls with happiness, and raised them to the contemplation of the Giver of all good.

In the greater part of the hollow the seats have been broken down and removed by the natives to build their houses and stables; but one side of the theatre is still tolerably perfect. Scattered over the arena, half buried with earth or covered with weeds, were several curious pieces of wrought marble, some of which the peasants dug up and sold to a French man-of-war while it lay at Milo. The theatre, or rather amphitheatre, must have been small. The annexed engraving, from a sketch made on the spot, may convey some idea of what remains of it. The building on the top of the hill behind it is a ruinous, crumbling fort, erected in comparatively modern times. The island in the distance, of which only a part is seen, is Argentiera, the Cimolus of the ancients, which, as well as Milo, was celebrated for producing chalk and a species of earth admirably suited to the purposes of washing linen, and is still used for soap.

The island of Milo is wholly volcanic; and the fire that raised its plains above the sea, and projected its lofty mountains, still burns in most places a very little below the level part. Sulphur of an excellent quality is produced all over the plains; and there are large beds of alum of various kinds, and all of the best quality, which were dug with great profit until the Turks loaded

Ruins of the Amphitheatre at Milo.

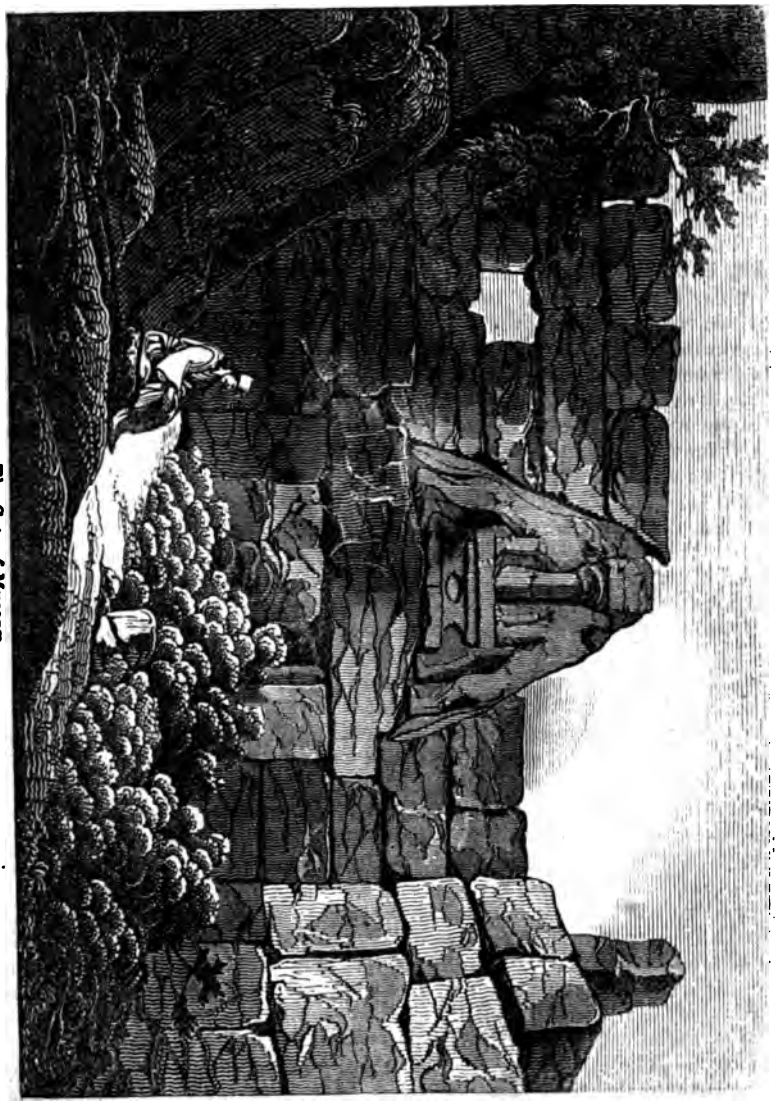
them with such heavy taxes and fees that the islanders shut up the mines and abandoned that branch of trade altogether. It is curious to observe, when any trade has once been turned from its course, how difficult it is to bring it back into its old channels; but the government of Greece may in time derive benefits from these minerals, as also from the beds of iron ore which are extensive in several districts of the island.

On the exterior coast of Milo, several springs of hot mineral-water ascend through the sands into the sea in much greater volume than those which are observed in the bay. At one point, just on the edge of the shore, where these waters can be caught before they mix with the sea, they are taken medicinally by the islanders, who, at one time, seemed scarcely to have any other medicine, or indeed any other physician.

Between the old town in the plain and the head of the bay or port, there are natural warm baths, which are entered by crawling through some passages (formed partly by nature and partly by art) in the side of a rock. These passages lead into two subterranean chambers or caves of inconsiderable size, and in each of these a spring of warm water, exceedingly salt to the taste, wells out and fills a shallow basin. The heat of this water is much less than that of the hot spring in the subterranean passage called the "Bath of Nero," at Baiæ in Italy, in which an egg can be boiled in three minutes; whereas, into these springs at Milo you can put your hands without inconvenience. The warmth of the atmosphere of the caverns, however, was greater than that of a Turkish vapor-bath, and makes one perspire most profusely. Still nearer to the shores of the bay other hot mineral-water is cast up through the sand in little streams, some of which are boiling hot. These springs do not seem to be confined to any particular spot, and even bubble up under the waters of the sea.

Mycenæ.—If the traveller lands at the port of Nauplia, or Napoli, or Anápli, as it is sometimes called in the Morea, and proceeds about ten miles northward in the plain of Argos, he will come to the remains of this ancient city, once the capital of Agamemnon, who, according to the Iliad of Homer, was the commander-in-chief of the assembled Greeks before the walls of Troy. This event took place (following the received chronology) about B. C. 1184. We can not indeed assert that the ruins of Mycenæ are not the remains of some buildings erected *after* the war of Troy; but all the arguments seem in favor of considering them of higher antiquity than that epoch.

Mycenæ stands near the extremity of the plain of Argos, on a rugged eminence between two summits of that range of hills which here bound the plain. This may be called an Acropolis, like the rocky height at Athens, on which the remains of the temple of Minerva (the Parthenon) now stand. The length of the Acropolis of Mycenæ is about four hundred yards, and its breadth about two hundred; and the unevenness of the surface, as well as some interior remains, show that it was divided into different parts. The whole circuit of this citadel can still be made out; and in some places the walls remain to the height of fifteen or twenty feet. They are constructed of huge stones, and belong to that style of building commonly named Cyclopean, from certain unknown personages, called Cyclopes by the Greek writers, who appear to have been very busy workmen, as we find their labors in many parts both of Italy and Greece. This description of wall-building is recognised by its massy materials, and by a certain style of rudeness; in which, however, different orders or epochs are easily distinguished. The oldest part of the walls of Mycenæ resembles the Cyclopean walls of Tiryns, a place to the south about seven miles distant, which are apparently nothing more than huge masses of unwrought stone, placed one above another, with



The Gate of Mycenæ.

the interstices filled up by smaller materials. Such structures belong to an early stage in architectural experiments, as we may see in the massy walls of the Peruvians, and the remains of Stonehenge and Avebury in England.

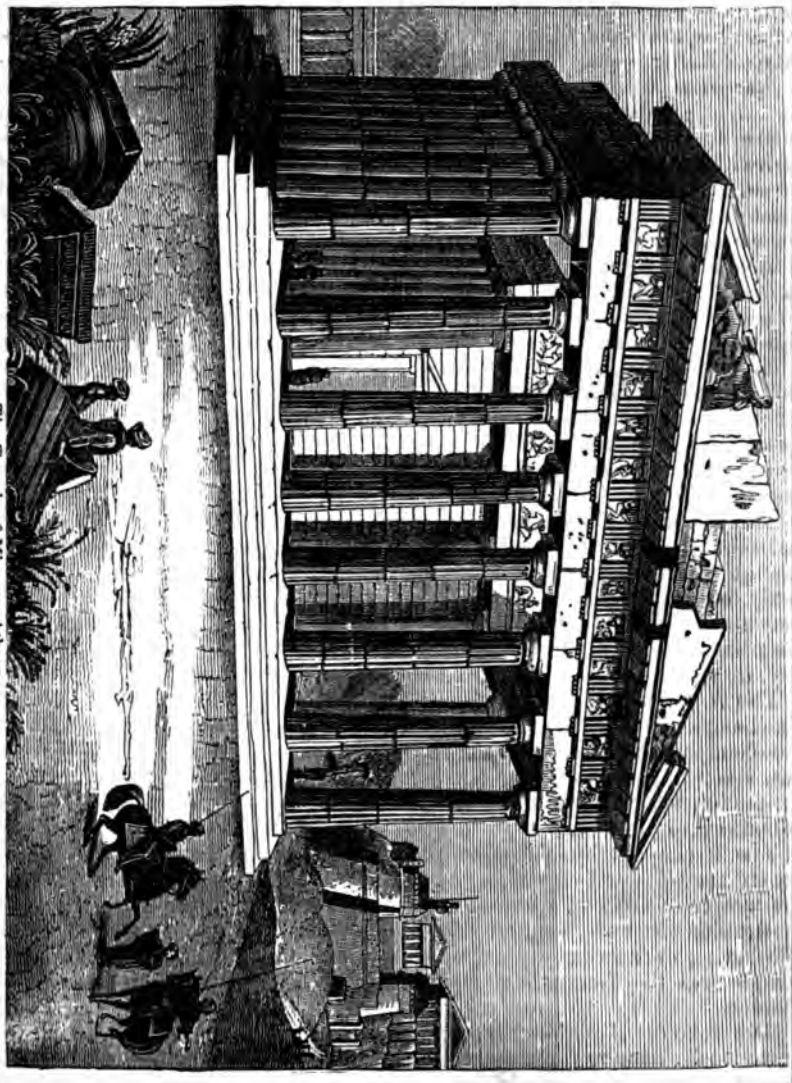
The citadel of Mycenæ is of an irregular oblong form, and is now chiefly an object of curiosity for the gate or great entrance at the northwest angle. The approach to this gate is by a passage fifty feet long and thirty wide, formed by two parallel and projecting walls, which were a part of the fortification, and were obviously designed to command the entrance, and annoy any enemy who might venture to attack the place.

The doorway is somewhat narrower at the top than the bottom, which we find also to be the case in Peruvian, and in some Egyptian doorways, but not, we believe, in the oldest architectural remains of the latter country. The width of the door at Mycenæ at the top is nine feet and a half. It is formed of three stones, two uprights, the height of which is not yet known, as they are buried a considerable depth in the earth; and a cross stone forming a soffit. This last is fifteen feet long, four wide, and six feet seven inches in the middle but diminishes toward each end. On this stone stands another of a triangular shape, which is twelve feet long, ten high, and two thick.. Two lions are cut in relief on the face of this stone, standing on their hind legs, on opposite sides of a round pillar, on which their fore paws rest. The column becomes broader toward the top, and is surmounted with a capital formed of a row of four circles, enclosed between two parallel fillets. The top of the stone with the heads of the lions is wanting, and perhaps something is gone from the top of the pillar between them. This singular gateway is described by a Greek traveller of the second century of our era, in the following words: "Mycenæ was destroyed by the people of Argos through jealousy; but there still remain parts of the wall, and the gate, which has lions over it. It is said that all this was the work of the Cyclopes, who built the wall of Tiryns for Proetus." The destruction of Mycenæ, here alluded to, took place B. C. 468; and though there are traces of some later repairs about the place, we have no reason to think that it was ever inhabited after that time by any considerable numbers: in the time of this traveller it was deserted, and still remains so, and probably hardly a single change has taken place, from his visit, down to the present time. The barbarians, who have used so freely the well-cut stones of Grecian temples to construct modern edifices, have not taken the pains to carry off the massive materials of Mycenæ and Tiryns.

Attempts have been made to explain the meaning of the two lions cut in stone, but there is not a single satisfactory point of comparison with other works of Grecian art that will help us in the conjecture. The lion has been in all countries and ages a favorite subject for sculpture; but the origin of this practice we do not conceive to have any connexion with a religious idea.

Besides the walls and gateways of Mycenæ (for there is also a postern-gate of smaller dimensions), we find the remains of four chambers, constructed in a peculiar way, which we may probably at some future opportunity describe. One of them is called the treasury of Atreus, according to an old tradition which had been handed down to the time of Pausanius.

Athens.—The antiquities of Athens are still so numerous, notwithstanding the ravages that time and barbarism have made among them, that they exceed those of any city in the world, Rome only excepted. That which claims our first attention is an ancient temple of Minerva, generally called the Parthenon (now a Turkish mosque), which is all built of white marble, and is, perhaps, the most beautiful piece of antiquity now in being. It is about two hundred and eighteen feet in length, and ninety-eight in breadth;



The Temple of Minerva, Athens.

and has on every side an ascent of five steps, that seem contrived as a basis to the portico, which is supported by channelled pillars of the Doric order, running all round the temple. These pillars are forty-six in number, forty-two feet high, and seventeen and a half in circumference. The front and frieze round about the temple, were charged with historical figures of admirable workmanship, many of which were standing about one hundred years ago. The back front was adorned with figures, representing the contest between Neptune and Minerva, about naming the city of Athens; but they have all fallen down. The architrave was also charged with bas-reliefs, cut in squares at several distances, which represented the wars of the Athenians, particularly their victory at Marathon, and that over the Gauls in Mysia. Within the portico we see a range of sculptures, which are undoubtedly coeval with the temple itself, and of excellent workmanship, representing sacrifices, processions, and other ceremonies of the heathen worship. This, like other pagan temples, was almost entirely dark within, having no other light but what came in at the doors; but there is now a window at the east end of it, which was made by the Greek Christians when they were in possession of it, and used it for divine service. Toward the bottom of this window are several stones, which admit through them a yellowish light, and have been said to shine in the dark, but are in reality only a kind of transparent marble.*

As to the founders of this beautiful temple, the body of it was built by Pericles, to which Attalus added the magnificent portico; but the emperor Adrian most probably repaired it, and adorned it with the figures on each front; for the whiteness of the marble, and that emperor's statue among the figures, plainly show those sculptures to be of a later date than the temple itself.

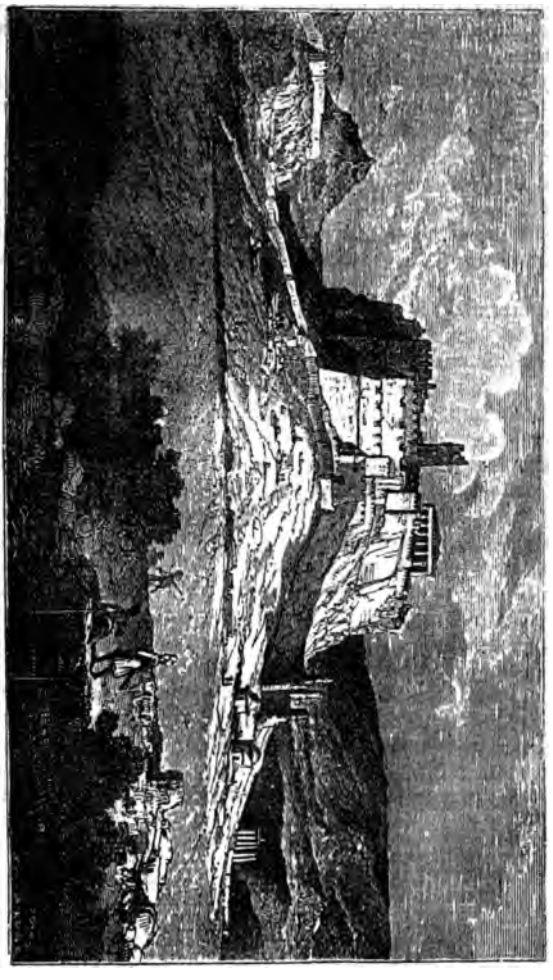
Athens was originally built on a lofty eminence, in the midst of a spacious and fertile plain; the situation was chosen, partly for the sake of security against piratical attacks, or sudden invasion, partly to prevent its being suddenly inundated—a fate much dreaded in the early ages. In process of time, the number of inhabitants being too great for this small space, great part of the plain was covered with buildings, which were denominated the lower city, as was the ancient part the Acropolis or upper city.

The Acropolis was once rich in stately buildings; the principal being the Parthenon, already noticed—which had it no other enemies than time and the elements, would probably have been in perfect preservation to this day; but, alas! Athens fell under the power of the Turks; and that barbarous people are said to have burnt many of the most precious statues and elegant columns into lime.

The lower city was likewise adorned with many magnificent buildings, among the principal of which were the temple of Theseus, built by Conon; the temple of Olympian Jupiter, and the Pantheon, or temple of the gods, a most noble structure, supported by one hundred and twenty marble pillars, and having over its great gate, two horses sculptured by Praxiteles. In this temple was the famous statue of Minerva, of ivory and gold, the work of Phidias.

The schools of philosophy and athletic exercises, called gymnasia, were numerous. Among the most celebrated were the lyceum, where Aristotle taught; and as he generally delivered his instructions to his disciples walking, they were called peripatetics. The Academy, so called from one Aca-

* This is the sort of marble, as Sir George Wheeler observes, which Pliny calls Phengites; and the temple of Fortune, built by Nero, was of this stone, which by its transparency supplied the want of windows, so that the inside received light enough, even when the doors were shut. It was anciently found in Cappadocia; but it is far from being peculiar to that country, very beautiful pieces of it having been found in France, Germany, and some parts of England.



The Acropolis, Athens.

demus, was the school where Plato disseminated the principles of his philosophy. It was a garden adorned with stately walks and rows of trees; and so sacred was it considered, that it was forbidden even to laugh there, that all appearance of levity might be excluded.

Athens was rendered a convenient port by three harbors; namely, the Piræus, Munychia, and Phalerum. Of these, the first was the most spacious, and was divided into three large basins, called Cantharos, Aphrodrium, and Zea. As this harbor was at the mouth of the Cephisus, three miles from the city, it was connected with it by two strong walls, defended by towers. The harbor was capacious enough to contain four hundred ships of the largest size used in that day.

The history of Athens affords a just specimen of the advantages of a democratic form of government. It gave rise to great statesmen and warriors, to moral philosophers and orators of unrivalled eloquence; for as all power emanated from the people, it was essentially necessary to cultivate sedulously those arts and that knowledge, by which their minds could be governed, and their passions influenced.

Long after Athens had ceased to be a free state, and had become a part of the Roman dominions, it continued to be the seat of learning and refinement.

Its schools, founded by Socrates and Plato, still flourished, though with diminished vigor; and the Athenians, while they had lost their military renown, still retained that polish which rendered them the most refined nation in the world. Yet, with all this refinement, the generality of the people are said to have been impious, vicious, and cruel.

While, therefore, Athens maintained its reputation for learning and politeness, and was the most renowned place for education of the Roman youth, it is not to be wondered at, that, as they imbibed useful knowledge, they likewise acquired many vices, and habituated themselves to practices, which, on their return to Rome, contributed to injure the morals of their fellow-citizens and to destroy that republican simplicity which had contributed so much to the extension of her power. To such a pitch had this arisen in the time of the emperor Justinian, that, by an edict, he suppressed the philosophical meetings of the Academy.

To minds imbued with the learning and eloquence of Greece, a visit to Athens is particularly interesting. At a distance it displays a magnificence nearly equal to that of its most flourishing state, the ruinous condition of its ancient structures not being then discernible. The Acropolis rises to the view with the most impressive grandeur, and the prodigious columns of the temple of Olympian Jupiter, are clearly to be seen between that citadel and the Ilissus.

SUBJECT XV.

ANTIQUITIES.

Tomb of Lysicrates.

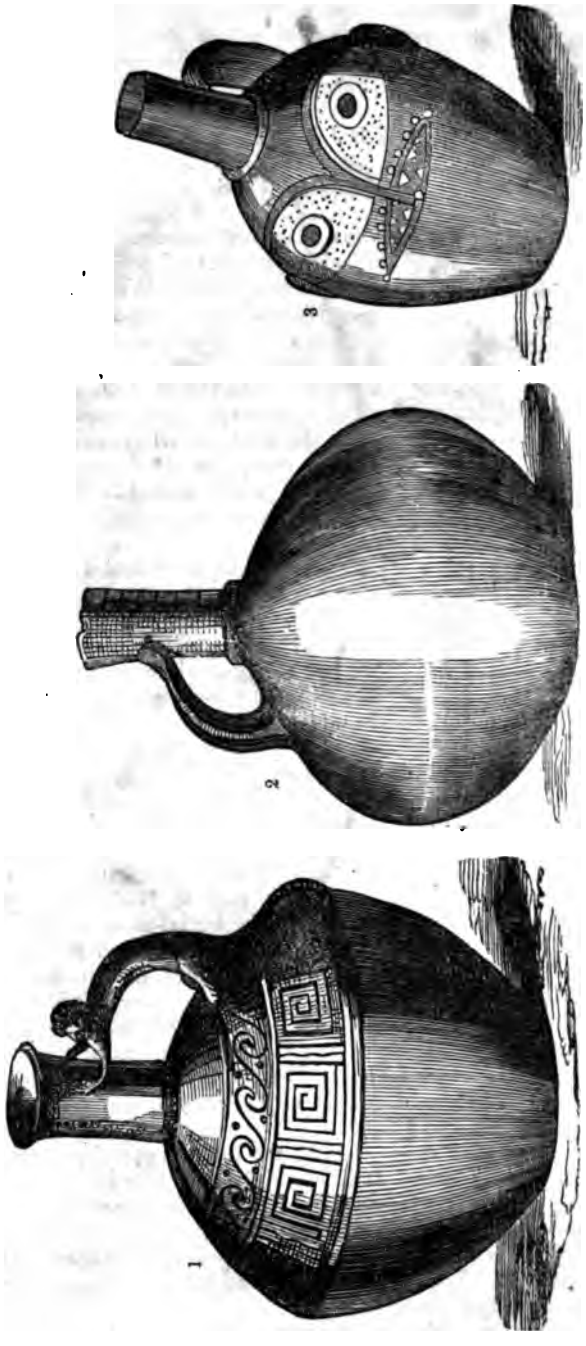
IT seems extremely natural to follow the subject of ruins with that of antiquities.

PERUVIAN JARS.—We have been favored by a correspondent with the following representations and descriptions of six jars lately sent from Peru. They have only recently been taken from the tombs of the ancient inhabitants of that country. It is interesting to contemplate the works of art at such a distant period, and to trace the similarities and differences which the wants and state of society have occasioned in the construction of utensils of general art.

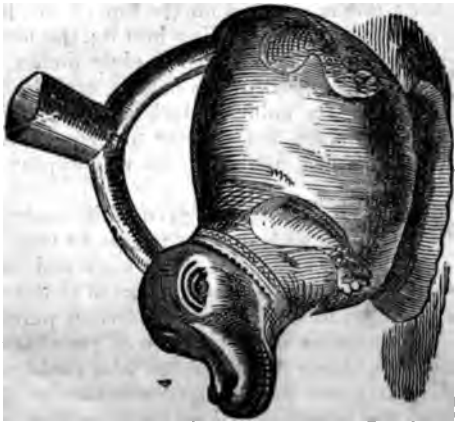
These vessels were found in what are known as the "Huacas," or tombs of the incas, near Truxillo, in Peru. But as the Peruvians in the fifteenth century are described as having arrived at a considerable state of civilization, and as their temples and buildings, both public and private, were richly adorned with exquisite workmanship, these rude remains must have been of much more ancient date, and are probably long antecedent to the conquest of Peru by Pizarro and his followers. Truxillo was founded by him in the year 1534. (See "Navigantium atque Itinerantium Bibliothe-ı," by John Harris, D. D., F. R. S., published in 1702.) It is therefore to ɜ presumed that it could not have been the burial-place of the incas.

1. This jar stands nearly six inches high, its diameter is four and a half; ɔlor black. There is a greater degree of elegance, both in the form and patrn of this, than in any of the others. Here may our lovely countrywomen ɔserve a fac-simile of the scroll which perhaps their fair fingers have braided ithin a few weeks or days, proving that "nothing is new under the sun." he grotesque figure which forms the handle is intended for a monkey. The attern is carved or indented, and exactly represents the *Vitruvian scroll* and ıe *Grecian fret*. This will naturally give rise to many conjectures respectıg the adoption of such ornaments by the inhabitants of a country so far reıote from the seat of arts. It is certainly a curious coincidence of ideas, ıat a people apparently so rude should have chosen an ornament similar in l its chief points to the most ancient enrichments of the earliest Grecian ge, which are to be found on the "Lantern of Demosthenes" at Athens (in ıe year 336 B. C.). The most learned antiquary will probably find great ifficulty in unravelling the mystery.

2. This jar is quite plain, and requires no observation to illustrate it. Its



Peruvian Jars.



Peruvian Jars.

form speaks for itself It is nine inches high and eight in diameter; color black.

3. This is in form of a modern pitcher, with a grotesque face raised on its surface, the ears projecting from its sides. It bears marks of having been formed in a mould, and afterward, while the clay was wet, the figures were carved or raised on it. Either this is of much more ancient date than the others, or it is the work of a very inferior artist, as the figure is more like the production of the natives of the South-sea islands. It stands obliquely, as figured, the bottom being rather convex; it is five inches high.

4. This was found with No. 6, and appears to be for the same use—that is, for holding liquor. It seems to be a rude representation of the hippopotamus; the head is flat and broad, with an extraordinary wide mouth; it has a curious collar partly round the neck; the legs are placed in an unmeaning manner on the sides, much too small in proportion. It stands seven and a half inches high, and seven and a fourth from the point of the nose to the hinder parts; its color nearly black, composed of grayish sandy earth, and appears sun-dried only. The foot or stand is hollow.

5. This bottle is of a different color from the others, being a light red with white stripes painted on the surface, and the earth of which it is formed is of a much finer texture. If such an hospitable custom prevailed among the aborigines of Peru as presenting their friends with the stirrup-cup, this with great propriety may have been used for that purpose. It stands seven and a half inches high, and the diameter is four and a fourth. The bottom is rather convex.

6. This ancient vessel appears to have been intended to hold liquor as a bottle. The figure is in a sitting posture, with the knees up; the head covered with a cap composed of two parts, confined under the chin by a string or band; the face, though rudely formed, exhibits the placid character of sleep or death, the closed eyes indicating the one or the other; the mouth is wide, the nose large, the lobes of the ears perforated, and much elongated by the weight of the large ornament thrust through them; the back of the body is enveloped by a mantle or cloak, having a collar quite round the neck, tied at the throat, the ends of the fastening hanging over the breast. There is no appearance of other garments; the limbs are very stiff and badly executed. It holds in its hands a fruit bearing some resemblance to a pine-apple or cherimaya, in which is a small air-hole to admit of the liquor flowing at the larger orifice; this is situated on the top of the handle, and there appears to be a figure of a monkey looking into it; the head of the monkey in the original is broken off. This vessel is eight inches high, five and a half from the breast to the lower part of the handle, and the diameter of the base four and three fourths. Its color is dark ash, approaching to black, with some lighter shades. It does not appear to have been cast; if so, it was fashioned by a tool afterward, as the marks of scraping and smoothing are very visible.

The Elgin Marbles.—No small degree of discussion was excited, on the first arrival of the Elgin marbles in England, as to their actual merit. This may appear extraordinary, considering the high and unquestionable excellence of these works. But it is to be recollected that sculpture does not address itself, like painting, to our plain and obvious perceptions, but depends for its due comprehension on a long course of peculiar and specific studies. We can not, therefore, blame those persons who could not at once perceive, or might not choose to make an implicit surrender of their judgments until they had perceived, the beautiful and sublime qualities of the Elgin marbles. The opinions given by the persons who were considered best qualified to

judge, before the house of commons, were pretty unanimous; and the point of perfection which they agreed in ascribing to these works was, the union of nature and ideality. This is the highest quality of art, whether in sculpture or painting, the common defect among the practitioners of both arts being an undue inclination to either one of those qualities, to the neglect of the other. An exclusive attention to *nature*, in the common acceptation of that term, degenerates into vulgarity; while the attempt to refine the representation of the human form by an ideal standard, without perpetual reference to living models, gives rise to *conventional style* or *manner*, the grave of excellence.

It is to Rome that we must refer for the history of sculpture, where the whole progress of the art, from its birth and maturity to its decline and fall, is developed in that vast collection of statues which embellishes the Vatican. During the long lapse of ages which ensued from the infancy of sculpture until the arts became extinguished in the subversion of the Roman empire, we perceive vast disparities of execution in the innumerable works extant, whether by Greek or Italian artists. These inequalities result rather from the various degrees of talent evinced by the practitioners, or from the influence of the times in which they lived, than from any actual difference of *style*, which refers itself uniformly to the principles established by the great masters of Greece, and is denominated the *style of the antique*. The art of sculpture was consummated in this style, which discarded individual peculiarities, and gave a high generic character to the human form. Thus was elicited that idea of abstract beauty which is embodied in the antique statues, and which the experience of all succeeding artists has taught them to be unapproachable through any other medium. But it is the fate of all excellence to suffer from unskilful imitation, and the calm and elevated beauty of the antique, when transmitted by the chisel of inferior practitioners, assumes the aspect of frigid and wooden inanity. On the revival of the arts in Italy, a new epoch in the annals of sculpture commenced with the appearance of Michael Angelo. That artist renounced the imitation of the antique and struck out a style which had no prototype except in his own imagination. It is said that he expressed regret at not having devoted his whole life to sculpture; a sentiment in which, no one, we think, will coincide, who has compared his statues with his paintings in the Sistine chapel. The sweeping convexity and angular decision of his manner are admirably adapted to pictures seen at such immense height and distance, but becomes harsh and overcharged in sculpture, which is intended for closer inspection. But Michael Angelo, if he fails to excite our sympathies, always extorts our reverence: he is not to be approached with levity; we feel that in his presence we are standing before a giant, who, if he does not conciliate us with beauty, commands our implicit homage by his energy and grandeur. The aberrations of Michael Angelo from what may be termed the legitimate style, may be considered, however, to have been chaste and classical, if compared with the eccentricities of Bernini, that most fantastical of professors, by whom the severe and solemn muse was compelled to descend from her pedestal, and perform the evolutions of a rope-dancer. The novelty introduced by Michael Angelo resulted from the innate and uncontrollable vigor of his faculties: that of Bernini arose from the desire to dress out sculpture in the attractions of picturesque effect; a vain and unphilosophical attempt, which has communicated to all his works a character of absurdity and extravagance, the natural consequence of attempting to regulate the practice of one art by the principles of another. Bernini, however, had considerable talent; it is only to be regretted that it was not better directed.

The schools of sculpture continued afterward to fluctuate under different impulses, nor can it be said that the principles of true taste began to revive until the genius of Canova dawned on Italy. The style of Greek sculpture may be said to have been resuscitated by his example. We have heard it asserted that his style is frequently meretricious, and without stopping to discuss whether this accusation may or may not be justly charged on some of his inferior performances, we allege, without fear of contradiction, that his groups of Hercules and Lichas, and of Theseus and the Centaur, may challenge equality with any composition of equal magnitude in ancient art. At the time when Canova visited England, the Elgin marbles had just been imported from Greece by the taste, patriotism, and enterprise, of the earl of Elgin, a Scottish nobleman, and they excited the highest admiration in the Italian artist.

The two principal statues among the Elgin marbles are those of Theseus, the Athenian hero, and a recumbent figure, supposed to be the river-god Ilissus. They are executed in a style of extraordinary breadth and grandeur. Theseus is represented half reclined on a rock, covered with the skin of a lion, and appears to be resting after some mighty labor. The figure of the Ilissus is less robust: all his contours flow in lines of undulating elegance. But in both these statues, that which chiefly strikes us, in spite of the dilapidations which they have suffered, is the vitality which seems to pervade them. In these, not only the office and appearance of the muscles, whether in action or at rest, but the bearings of the skeleton, are expressed with an accuracy which could only have resulted from the most profound science, added to an acute and perpetual observation of nature. The statue of the Ilissus is especially remarkable for its graceful flexibility, and we would observe, without going too technically into the subject, how different is the indentation formed by the lower line of the ribs in this figure, so admirably expressing its position, from that geometrical arch by which this part of the body is designated in the ordinary antique statues, and which is so rarely accommodated to the action represented. The principle pointed out in this instance may be traced throughout the Elgin marbles, in which true art is never superseded by conventional style. We believe that in the opinion of the majority of connoisseurs, the statue of Theseus is considered superior to that of the Ilissus. Canova, however, preferred the latter; and Raffaelle, who imported designs from Greece, has adapted this figure to that of the fallen Commander, in his picture of Heliodorus. It is well known that the Ilissus was a small stream which ran along the south side of the plain of Athens. The statue in which it is here personified occupied the left angle of the west pediment of the Parthenon, and that of the Theseus was placed opposite to it on the east pediment, next to the horses of Hyperion.

The statues of Theseus and the Ilissus, although much dilapidated, have suffered less than most of the other figures which ornamented the pediments of the Parthenon. The subjects of these sculptures were, the birth of Minerva, on the eastern pediment; and on the western, the contest between Minerva and Neptune for the honor of giving birth to the city of Athens. The whole arrangement of those groups may be seen in Stuart's celebrated work on Athens. The figures which are in the best preservation, after the two above mentioned, are those of the two goddesses, probably Ceres and her daughter Proserpine, and a group of the three Fates.

When seen near at hand, there appears, in these figures particularly, to be something small and wiry in the execution of the draperies, differing essentially from the general breadth and largeness of style which characterize the Elgin marbles. But the sculptor's intention becomes apparent when the

The Theseus.

The Ilissus.

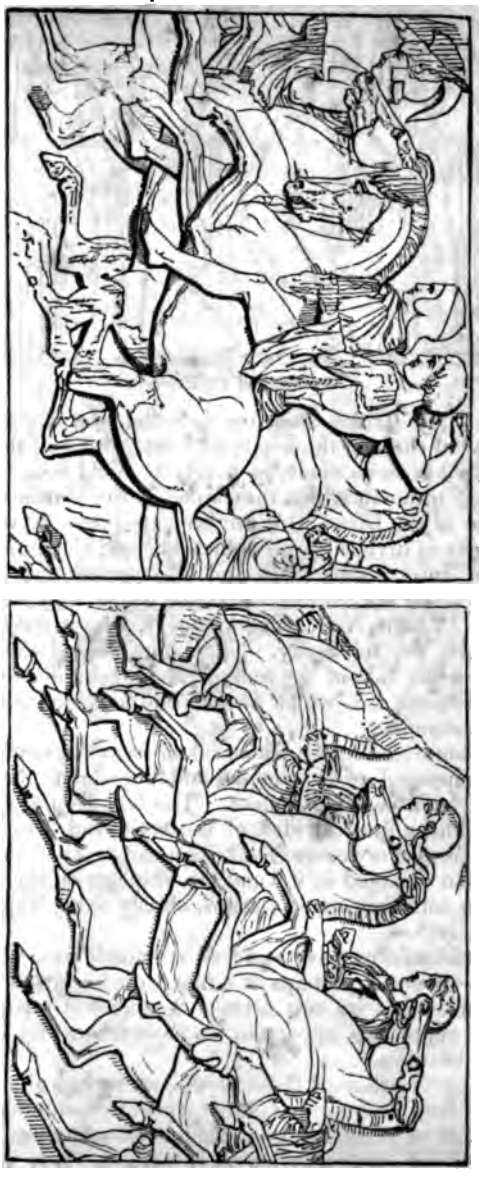
group is seen in its present situation; the figures form into the finest masses, and the sharp and multiplied lines give an air of lightness and delicacy proper to female drapery.

Our attention is next engaged by the "Metopes," a series of figures in very high relief, which, alternately with the triglyphs, ornamented the frieze of the entablature surmounting the colonnade of the Parthenon. The subjects are the same throughout: the contests of the Centaurs and Lapithæ, or rather between the Centaurs and Athenians, who, under the direction of Theseus, became the allies of the Lapithæ. These groups exhibit great spirit and variety of action; their fine contours, however, are never disfigured by violent or extravagant contortions. Victory appears doubtful: here an Athenian, and there a Centaur, seems to triumph; and the compositions are occasionally varied by the introduction of female figures whom the Centaurs are endeavoring to bear away. These alto-relievoes are executed with great boldness and vigor. We have selected two from the series.

Metopes.

There is no portion of the Elgin marbles by which our attention is more strongly arrested, or which more strikingly evinces the high excellence which art had attained at the epoch in which they were executed, than the sculptures which compose the exterior frieze of the Cella of the Parthenon; this series was continued in an uninterrupted succession completely round the temple. It is in very low relief, and represents the sacred procession that occurred at the great Panathenæa, a magnificent festival which was celebrated once every five years, at Athens, in honor of Minerva, the patroness of the city. Those sculptures which occupied the principal front of the temple, namely, the east, commence on the left hand of the visiter as he en-

Metopes.



North Side of the Frieze.

East side of the Frieze.

ters the room of the British Museum (in which the Elgin collection is deposited), then follow those of the north, and lastly those of the west and south. The arrangement has been made, as nearly as could be ascertained, according to the original order in which they stood in the Parthenon.

In that portion of the frieze which ornamented the east end of the temple are representations of divinities and deified heroes: Castor and Pollux, Ceres and Triptolemus, Jupiter and Juno, and Æsculapius and Hygeia. On the right and left of these sacred characters are trains of females bearing offerings to the gods. At intervals, officers appear, whose duty it was to superintend and regulate the solemnity. These females led the procession, both on the north and south side of the temple, and were followed by the charioteers, horsemen, victims, &c., which formed a procession up to the same point in two separate columns.

The subjects comprised in the frieze taken from the north side of the temple are chiefly composed of charioteers and horsemen. Some among these are considered pre-eminently excellent. The two groups given in the above engraving will afford a general idea of the style and arrangement of these figures. Those from the western frieze appear to be rather preparing for the procession than engaged in it; and the subjects on the southern side are diversified by the introduction of victims, chiefly oxen, which are led on for the purpose of sacrifice.

These fine performances have suffered so much from time and violence, that the observer may not perhaps at a first view be struck with their extraordinary excellence; but we are certain that no one possessing a tolerably natural taste will repeat his inspection of them frequently without becoming sensible of their beauties.

For the due appreciation of those works, no technical acquaintance with art is necessary: they are executed in that style of consummate mastery which discards the parade of recondite knowledge, and addresses itself to the spectator in the broad and general language of nature. It is not only in the human figure that the profound skill of these works is evinced. When we look at the horses in the frieze, we are almost tempted to think that beautiful animal has never elsewhere been adequately represented, either in sculpture or in the more tractable material of painting. Even the horses of Rubens, ad-

mirable as they are, are individual; but those of the Elgin marbles exhibit throughout the *generic* character of the animal: and it is impossible to look on the succession of groups here represented, in every variety of action, without feeling animated and exhilarated as if the procession were really passing before us. The most casual observer must be struck with the grace and elegance of the riders, who seem formed indeed "to witch the world with noble horsemanship." The fire and vivacity of those figures are finely contrasted with the devout and reverential air of the females who lead the procession.

THE MEMNON FIGURED HEAD.—Though this statue is commonly called the "younger Memnon," a name to which for convenience we shall adhere, there is no reason in the world for calling it so, but a mistake of Norden, a Danish traveller, who visited Egypt in 1737. He then saw this statue in its entire state, seated on a chair, but lying prostrate with its face on the ground; to which accident, indeed, the preservation of the features is no doubt mainly due. Several ancient writers, and amongst them the Greek geographer Strabo, speak of a large temple at Thebes, on the west side of the Nile, to which they applied the name of the Memnonium, or Memnon's temple. Norden imagined that the building, amid whose ruins he saw this statue, was the ancient Memnonium, though he supposed that another statue of much larger dimensions than this, and now lying in numerous fragments in the same place, was the great statue of Memnon, of which some ancient writers relate the following fact—that at sunrise when the rays first struck the statue, it sent forth a sound something like that of the snapping of the string of a lute.

Statue of Memnon.

It is now generally admitted that the real statue of Memnon is neither the large one still lying at Thebes in fragments, nor this statue, which came out of the same temple—but another statue still seated in its original position on

the plain of Thebes, and showing by numerous Greek and Latin inscriptions that *it* was the statue of which Strabo, Pausanias, and other ancient writers, speak. The entire "black statue" is also *a* Memnon statue, for it resembles in all respects the great colossus with the inscriptions on its legs, and it has also the name Memnon written on it and enclosed in an oblong ring, on each side of the front part of the seat, and also on the back.

If this colossus was entire in 1737, it may be asked how came it to be broken? We can not say further than the following statement:—

Belzoni, whose name must be fresh in the recollection of most people, went to Egypt in 1815, intending to propose to the pacha some improved mechanical contrivances for raising water from the river in order to irrigate the fields. Owing to various obstacles this scheme did not succeed, and Belzoni determined to pay a visit to Upper Egypt, to see the wonderful remains of its temples. Mr. Salt, then British consul in Egypt, and Lewis Burckhardt, commissioned Belzoni to bring this colossal head from Thebes. Belzoni went up the river, and landing at Thebes, found the statue exactly in the place where the consul's instructions described it to be. It was lying "near the remains of its body and chair, with its face upward, and apparently smiling on me at the thought of being taken to England. I must say that my expectations were exceeded by its beauty, but not by its size. I observed that it must have been absolutely the same statue as is mentioned by Norden, lying in his time with its face downward, which must have been the cause of its preservation. I will not venture to assert," continues Belzoni, "who separated the bust from the rest of the body by an explosion, or by whom the bust has been turned with its face upward."

It will be observed that the left shoulder of the figure is shattered, and that there is a large hole drilled in the right shoulder. We believe both are the work of the French who visited Thebes during the occupation of Egypt by the French army in 1800; and there is no doubt that Belzoni in the above extract means to attribute to them the separation of the head and shoulders from the rest of the body. In the magnificent work on "Egyptian Antiquities," which has been published at Paris, there is a drawing of this head, which is pretty correct, except that the hole and the whole *right* shoulder are wanting. It seems that they drew the colossal bust in that form which it would have assumed, had they blown off the right shoulder. From what cause it happened we do not know, but they left the colossus behind them; and Belzoni, alone and unaided, accomplished what the French had unsuccessfully attempted.

All the implements that Belzoni had for removing this colossus were fourteen poles, eight of which were employed in making a car for the colossus, four ropes of palm-leaves, four rollers, and no tackle of any description. With these sorry implements, and such wretched workmen as the place could produce, he contrived to remove the colossus from the ruins where it lay to the banks of the Nile, a distance considerably more than a mile. But it was a no less difficult task to place the colossus on board a boat, the bank of the river being "more than fifteen feet above the level of the water, which had retired at least a hundred feet from it." This, however, was effected by making a sloping causeway, along which the heavy mass descended slowly till it came to the lower part, where, by means of four poles, a kind of bridge was made, having one end resting on the centre parts of the boat, and the other on the inclined plane. Thus the colossus was moved into the boat without any danger of tilting it over by pressing too much on one side. From Thebes *it was* carried down the river to Rosetta and thence to Alexandria, a distance *of four* hundred miles; from the latter place it was embarked for England.

The material of this colossus is a fine-grained granite, which is found in the quarries near the southern boundary of Egypt, from which masses of enormous size may be procured free from any split or fracture. These quarries supplied the Egyptians with the principal materials for their colossal statues and obelisks, some of which in an unfinished form may still be seen in the granite quarries of Assouan. There is considerable variety in the qualities of this granite, yet all of them admit a fine polish.

This Memnon's bust consists of one piece of stone, of two different colors, of which the sculptor has very judiciously applied the red part to form the face. Though there is a style of sculpture which we may properly call Egyptian as distinguished from and inferior to the Greek, and though this statue clearly belongs to this Egyptian style, it surpasses as a work of art most other statues from that country by a peculiar sweetness of expression and a finer outline of the face. Although the eyebrows are scarcely prominent enough for our taste, the nose rather too rounded, and the lips too thick, it must be confessed that there is great loveliness stamped on the countenance. Its profile, when viewed from various positions, will probably exhibit some new beauties to those only accustomed to look at it in front.

Side View of the Memnon Statue.

The position of the ear in all Egyptian statues that we have had an opportunity of observing is very peculiar, being always too high; and the ear itself is rather large. We might almost infer that there was some national peculiarity in this member from seeing it so invariably placed in the same singular position. The appendage to the chin is common in Egyptian colossal statues, and is undoubtedly intended to mark the beard, the symbol of manhood: and it may be observed, not only on numerous statues, but also on painted reliefs, where we frequently see it projecting from the end of the chin and not attached to the breast, but slightly curved upward. Osiris, [illegible]

of the great objects of Egyptian adoration, is often thus represented; but the beard is generally only attached to the *clothed* figure, being, for the most part, but not always, omitted on naked ones. On the forehead of this colossus may be seen the remains of the erect serpent, the emblem of royalty, which always indicates a deity or a royal personage.

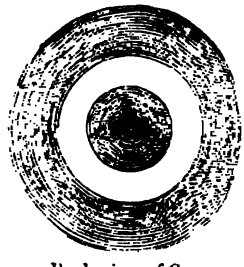
Judging from its dimensions, the figure in its entire state would be about twenty-four feet high as seated on its chair; which is about half the height of the *real* Memnon, who still sits majestic on his ancient throne, and throws his long shadow at sunrise over the plain of Thebes.

INDIAN ANTIQUITIES.—The "Great West" furnishes us with many curious antiquities. In the ancient mound at Marietta, Ohio, some remarkable things have been found.

In removing the earth which composed an ancient mound in one of the streets of Marietta, on the margin of the plain, near the aboriginal fortifications, several curious articles were discovered in the year 1836. They appear to have been buried with the body of the person to whose memory this mound was erected.

Lying immediately over, or on the forehead of the body, were found three large circular bosses, or ornaments for a sword-belt, or a buckler; they are composed of copper, overlaid with a thick plate of silver. The fronts of them are slightly convex, with a depression, like a cup, in the centre, and measure two and a quarter inches across the face of each. On the reverse side, opposite the depressed portion of the front, is a copper rivet or nail, around which are two separate plates, by which they were fastened to the leather.

Front view of Ornament of Silver.



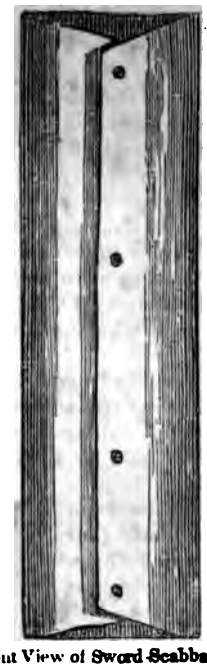
Back view of Copper.

Two small pieces of the leather were found lying between the plates of one of the bosses; they resemble the skin of an old mummy, and seem to have been preserved by the salts of the copper. The plates of copper are nearly reduced to an oxyde, or rust. The silver looks quite black, but is not much corroded, and on rubbing, it becomes quite brilliant. Two of these are yet entire; the third one is so much wasted, that it dropped in pieces on removing it from the earth. Around the rivet of one of them is a small quantity of flax or hemp, in a tolerable state of preservation.

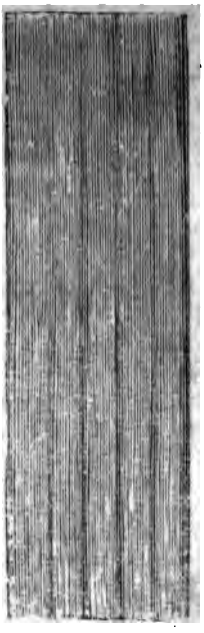
Near the side of the body was found a plate of silver, which appears to have been the upper part of a sword-scabbard; it is six inches in length and two inches in breadth, and weighs one ounce; it has no ornaments or figures, but has three longitudinal ridges, which probably correspond with edges or ridges of the sword. It seems to have been fastened to the scabbard by three or four rivets, the holes of which yet remain in the silver.

Two or three broken pieces of a copper tube were also found, filled with iron rust. These pieces, from their appearance, composed the lower end of the scabbard, near the point of the sword. No sign of the sword itself was discovered, except the appearance of rust above mentioned.

Near the feet was found a piece of copper, weighing three ounces. From its shape it appears to have been used as a plumb, or for an ornament, as near one of the ends is a circular crease, or groove, for tying a thread; it is round, two and a half inches in length, one inch in diameter at the centre,



Front View of Sword-Scabbard.



Back view.

Copper Plumb or Pendant.

and half an inch at each end. It is composed of small pieces of native copper pounded together, and in the cracks between the pieces are stuck several pieces of silver, one nearly the size of a fourpenny piece, or half a dime. This copper ornament was covered with a coat of green rust, and is considerably corroded. A piece of red ochre, or paint, and a piece of iron ore, which has the appearance of having been partially vitrified or melted, were also found. The ore is about the specific gravity of pure iron.

The body of the person here buried was laid on the surface of the earth, with his face upward, and his feet pointing to the northeast and head to the southwest. From the appearance of several pieces of charcoal and bits of partially-burnt fossil-coal, and the black color of the earth, it would seem that the funereal obsequies had been celebrated by fire; and while the ashes were yet hot and smoking, a circle of thin flat stones had been laid around and over the body. The circular covering is about eight feet in diameter, and the stones yet look black, as if stained by fire and smoke. This circle of stones seems to have been the nucleus on which the mound was formed, as immediately over them is heaped the common earth of the adjacent plain, composed of a clayey sand and coarse gravel. This mound must originally have been about ten feet high, and thirty feet in diameter at its base. At the time of opening it, the height was six feet, and diameter between thirty and forty. It has every appearance of being as old as any in the neighborhood, and was, at the first settlement of Marietta, covered with large trees, the remains of whose roots were yet apparent in digging away the earth. It also seems to have been made for this single personage, as the remains of one skeleton only were discovered. The bones were much decayed, and many of them crumbled to dust on exposure to the air. From the length of some of them it is supposed the person was about six feet in height.

Nothing unusual was discovered in their form, except that those of the skull were uncommonly thick. The situation of the mound on high ground, near the margin of the plain, and the porous quality of the earth, are admirably calculated to preserve any perishable substance from the certain decay which would attend it in many other situations. To these circumstances is attributed the tolerable state of preservation in which several of the articles above described were found, after laying in the earth for several centuries. We say centuries, from the fact that trees were found growing on those ancient works whose ages were ascertained to amount to between four and five hundred years each, by counting the concentric circles in the stumps after the trees are cut down; and on the ground beside them were other trees in a state of decay that appeared to have fallen from old age. Of what language or of what nation were this mighty race that once inhabited the territory watered by the Ohio, remains yet a mystery.

But from what we see of their works, they must have had *some* acquaintance with the arts and sciences. They have left us perfect specimens of circles, squares, octagons, and parallel lines, on a grand and noble scale. And unless it can be proved that they had intercourse with Asia or Europe, we now see that they possessed the art of working in metals.

In addition to the articles found at Marietta, there have been procured from a mound on the Little Muskingum, about four miles from Marietta, some pieces of copper, which appear to have been the front part of a helmet. It was originally about eight inches long and four broad, and has marks of being attached to leather; it is much decayed, and is now quite a thin plate. A copper ornament, in imitation of those described as found in Marietta, was discovered with the plate, and appears to have been attached to the centre of it by a rivet, the hole for which remains, both in the plate and ornament. At this place the remains of a skeleton were found. No part of it retained its form, but a portion of the forehead and skull, which lay under the plate of copper. These bones are deeply tinged with green, and appear to have been preserved by the salts of the copper.

The mound in which these relics were found is about the magnitude of the one in Marietta, and has every appearance of being as ancient. Some pieces of ancient potter's ware were also found within the ancient works at Marietta. They are, some of them, neatly wrought, and composed of pounded flintstone and clay. They are yet quite solid and firm, although they have lain for several years, exposed to rain and frost, on the surface of the ground.

Pieces of broken ware are often found near the banks of the river (Little Muskingum); but they are composed of clay and pounded clam-shells, are much less compact and firm, and do not appear to have been burnt. They are evidently of the same composition with those made by the modern Indians.

It seems to be a well-established fact that the bodies of nearly all those buried in mounds were partially, if not entirely, consumed by fire, before the mounds were built. This is made to appear by quantities of charcoal being found at the centre and base of the mounds—stones burned and blackened—and marks of fire on the metallic substances buried with them. It is a matter of much regret that on no one of the articles yet found have been discovered any letters, characters, or hieroglyphics, which would point to what nation or age these people belonged. We have been told by an eyewitness

that a few years ago, near Blacksburgh, in Virginia, eighty miles from Marietta, there was found about half of a steel bow, which, when entire, would measure five or six feet; the other part was corroded or broken. The father of the man who found it was a blacksmith, and worked up this curious article, we suppose, with as little remorse as he would an old gun-barrel. Mounds are very frequent in that neighborhood, and many curious articles of antiquity have been found there.

It is related from good authority that an ornament composed of very pure gold, something similar to those found in Marietta, was discovered a few years since in Ross county, Ohio, near Chillicothe, lying in the palm of a skeleton's hand, in a small mound. This curiosity, it is stated, is in the museum at Philadelphia.

By far the most curious remains, however, to be found on this continent, occur in Central America, to which we have already alluded when speaking of Palenque. Our engraving on page 366 represents a stone idol found at Copan. Mr. J. L. Stephens, in the work already quoted, remarks:—

It stands at the foot of a wall rising in steps to the height of thirty or forty feet; originally much higher, but the rest fallen and in ruins. Its face is to the north; its height eleven feet nine inches, the breadth of its sides three feet, and the pedestal is seven feet square. Before it, at a distance of twelve feet, is a colossal altar. It is of good workmanship, and has been painted red, though scarcely any vestige of the paint remains, and the surface is time-worn. The engraving given on page 366 represents the front view. It appears to represent the portrait of a king or hero, perhaps erected into a deity. It is judged to be a portrait, from certain marks of individuality in the features, also observable in most of the others, and its sex is ascertained by the beard, as in the Egyptian monuments, though this has a mustache, which is not found in Egyptian portraits.

The back of this idol, again, presents an entirely different subject, consisting of two tablets, each containing two figures oddly grouped together, ill-formed, in some cases with hideous heads, while in others the natural countenance is preserved. The ornaments, diadems, and dresses, are interesting, but what these personages are doing or suffering it is impossible to make out. This statue has suffered so much from the action of time and weather, that it was not always easy to make out the characters, the light being in all cases very bad, and coming through irregular openings among the trees.

The stone of which all these altars and statues are made is a soft grit-stone. At the quarries we observed many blocks with hard flint-stones distributed through them, which had been rejected by the workmen after they had been quarried out. The back of this monument had contained two. Between the second and third tablets the flint has been picked out, and the sculpture is blurred; the other, in the last row but one from the bottom, remains untouched. An inference from this is, that the sculptor had no instruments with which he could cut so hard a stone, and, consequently, that iron was unknown. We had, of course, directed our searches and inquiries particularly to this point, but did not find any pieces of iron or other metal, nor could we hear of any having ever been found there.

Of the moral effect of the monuments themselves, standing as they do in the depths of a tropical forest, silent and solemn, strange in design, excellent in sculpture, rich in ornament, differing from the works of any other people, their uses and purposes, their whole history so entirely unknown, with hieroglyphics explaining all, but perfectly unintelligible, I shall not pretend to convey any idea. Often the imagination was pained in gazing at them. The one which pervades the ruins is that of deep solemnity. An imaginative

mind might be infected with superstitious feelings. From constantly calling them by that name in our intercourse with the Indians, we regarded these solemn memorials as "idols"—deified kings and heroes—objects of adoration and ceremonial worship. We did not find on either of the monuments or sculptured fragments any delineations of human, or, in fact, any other kind of sacrifice, but had no doubt that the large sculptured stone invariably found before each "idol" was employed as a sacrificial altar. The form of sculpture most frequently met with was a death's head, sometimes the principal ornament, and sometimes only accessory; whole rows of them on the outer wall, adding gloom to the mystery of the place, keeping before the eyes of the living death and the grave, presenting the idea of a holy city—the Mecca or Jerusalem of an unknown people.

In regard to the age of this desolate city I shall not at present offer any conjecture. Some idea might perhaps be formed from the accumulations of earth and the gigantic trees growing on the top of the ruined structures, but it would be uncertain and unsatisfactory. Nor shall I at this moment offer any conjecture in regard to the people who built it, or to the time when or the means by which it was depopulated, and became a desolation and ruin; whether it fell by the sword, or famine, or pestilence. The trees which shroud it may have sprung from the blood of its slaughtered inhabitants; they may have perished howling with hunger; or pestilence, like the cholera, may have piled its streets with dead, and driven for ever the feeble remnants from their homes: of which dire calamities to other cities we have authentic accounts, in eras both prior and subsequent to the discovery of the country by the Spaniards. One thing I believe, that its history is graven on its monuments. No Champollion has yet brought to them the energies of his inquiring mind Who shall read them?—

> "Chaos of ruins! who shall trace the void,
> O'er the dim fragments cast a lunar light,
> And say 'here *was* or is,' where all is doubly night?"

THE END.